

---

## APPENDIX A

## REFERENCES

- (CIMIS, 2010) California Irrigation Management Information System, Department of Water Resources, Office of Water Use Efficiency. *Standard Monthly Evapotranspiration Data*. Station 199: Big Bear Lake, July 2005 to March 2012. [www.cimis.water.ca.gov]
- (CDM, 2006) CDM. *Water Master Plan 2006*. Prepared for the City of Big Bear Lake Department of Water and Power.
- (CDM, 2005) CDM. *2005 Urban Water Management Plan*. Prepared for the City of Big Bear Lake Department of Water and Power.
- (CUWCC, 2010) California Urban Water Conservation Council [http://bmp.cuwcc.org/bmp/default.htm]
- (DWP, 2010) City of Big Bear Lake – Department of Water and Power, *Reconnaissance Analysis of Alternative Water Sources*. March 2010.
- (DWR, 2004) State of California Department of Water Resources (DWR). *Bulletin 118: California's Groundwater Bulletin*. Updated 2003. Accessed 22 October 2010. [http://www.water.ca.gov/groundwater/gwmanagement/]
- (ER, 2010) Engineering Resources of Southern California. *Big Bear Area Regional Wastewater Agency Sewer Master Plan*. Adopted 2010
- (GP, 2008) City of Big Bear Lake Planning Department. *City of Big Bear Lake General Plan, Housing Element 2008-2014*. May 2011.
- (LCA, 1987a) LeRoy Crandall and Associates. 1987a. *Re-evaluation of Sustained Ground Water Yield, Big Bear Lake Watershed, San Bernardino County, California*. Prepared for Big Bear Lake Department of Water and Power. Consultant's Report.
- (LCA, 1987b) LeRoy Crandall and Associates. 1987b. *Re-evaluation of Sustained Ground Water Yield, Baldwin Lake Watershed, San Bernardino County, California*. Prepared for Big Bear Lake Department of Water and Power. Consultant's Report.
- (UCSB, 2010) United States Census Bureau. *2010 Census*. [http://factfinder2.census.gov/] Accessed April 2012.
- (WRCC, 1988) Western Regional Climate Center, *Station 040741 – Big Bear Lake*. July 1960 to January 2012.

The Page Left Blank Intentionally

---

**PUBLIC REVIEW AND ADOPTION MATERIALS**

This Page Left Blank Intentionally

**RESOLUTION NO. 2012-08**

**A RESOLUTION OF THE BOARD OF COMMISSIONERS  
OF THE DEPARTMENT OF WATER & POWER  
OF THE CITY OF BIG BEAR LAKE  
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA  
ADOPTING THE 2010 URBAN WATER MANAGEMENT PLAN**

**WHEREAS**, the Department of Water & Power (DWP), of the City of Big Bear Lake, was created by an amendment to the City Charter, and

**WHEREAS**, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610, et seq., known as the Urban Water Management Planning Act) during the 1983-1984 Regular Session, and as amended subsequently, which mandates that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, prepare an Urban Water Management Plan ("Plan"), the primary objective of which is to plan for the conservation and efficient use of water, ensuring sufficient water supplies and providing a mechanism for response during drought conditions; and

**WHEREAS**, the Urban Water Management Planning Act was updated most recently by the California State Legislature in November 2009 through the Water Conservation Bill of 2009 in response to water supplies in California, and this update includes a requirement for urban water suppliers to reduce per capita water consumption twenty percent by 2020 and document baselines, targets and compliance in the 2010 Plan and subsequent plans; and

**WHEREAS**, the Plan shall be periodically reviewed at least once every five years and submitted in December of years ending in five and zero; and

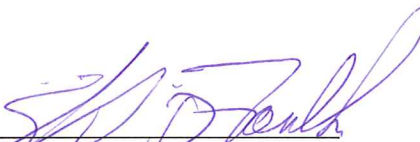
**WHEREAS**, the DWP reviewed the Draft Urban Water Management Plan, and conducted a public hearing at a regularly scheduled Board meeting on June 26, 2012, and

**WHEREAS**, the DWP Board of Commissioners voted to approve the Draft Urban Water Management Plan as amended by the comments received.


**NOW, THEREFORE, BE IT RESOLVED** that the Board of Commissioners does here by adopt the 2010 Urban Water Management Plan dated June 26, 2012.

**PASSED, APPROVED AND ADOPTED** this 26<sup>th</sup> day of June 2012.

June 26, 2012  
Date

  
\_\_\_\_\_  
Stephen D. Foulkes, Chair  
DWP Board of Commissioners

ATTEST:

  
\_\_\_\_\_  
Diego Chavez, Secretary to the Board  
DWP Board of Commissioners

**CERTIFICATION**

**STATE OF CALIFORNIA  
COUNTY OF SAN BERNARDINO  
CITY OF BIG BEAR LAKE**


I, Diego Chavez, Secretary to the Board of Commissioners of the Department of Water & Power, of the City of Big Bear Lake, California, do hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2012-08, was duly passed and adopted by said Board and attested to by the Secretary of said Board, all at a Regular Meeting of said Board, held on the 26<sup>th</sup> day of June, 2012, that same was so passed and adopted by the following vote:

AYES: Foulkes, Giamarino, Tarras, Smith

NOES:

ABSENT: Miller

ABSTAIN:

  
\_\_\_\_\_  
Diego Chavez, Secretary to the Board  
DWP Board of Commissioners

*SEAL*

## Notice Of Public Hearing 2010 Urban Water Management Plan Pursuant

Today's Weather

### Notice of Public Hearing

2010 Urban Water

Management Plan

Pursuant to California Water Code (CWC) section 10642 and 10608, a public hearing will be held on the 2010 Urban Water Management Plan (2010 UWMP).

The City of Big Bear Lake Department of Water and Power (DWP) will conduct a public hearing on June 26, 2012, at 9:00 am in the Board Room located at 41972 Garstin Dr. Big Bear Lake, California to receive public comment relative to the proposed 2010 UWMP and the water conservation baseline and targets associated with the Water Conservation Act of 2009. The California Water Code requires all urban water suppliers within the state serving 3,000 or more connections to prepare an Urban Water Management Plan and update them every five years, with years ending with 0 and 5. This will be an update to the DWP's 2005 UWMP. The 2010 UWMP complies with recent amendments to the CWC.

A copy of the 2010 Final Draft UWMP is available, during normal business hours, at the DWP office. You can also access this document at the DWP website at [www.bbldwp.com](http://www.bbldwp.com).

For questions concerning the document, please contact Amelia Ray at (909) 866-5050. Written comments are requested by the close of business on June 15, 2012.

Send written comments to: DWP, Attention: Amelia Ray, PO Box 1929, Big Bear Lake, CA 92315.

**Publish: 6/6/12, 6/13/12**

### Location:

41972 Garstin Dr

### Contact

#### Contact



Listing ID: efe195c5-b133-5f32-9b9d-f4ed62e6df79

© Copyright 2012, Big Bear Grizzly, Big Bear Lake, CA. Powered by BLOX Content Management System from TownNews.com.

## NOTICES

**OFFICE OF THE TRUSTEE'S SALE:**  
 1100358 Trust-  
 7088 Loan No.:  
 0312-042-08-0-  
 Default under a  
 dated 06/02/2005.  
 action to protect  
 may be sold at a  
 you need an expla-  
 of the prop-  
 you, you should  
**On 06/12/2012**  
 Lender Services,  
 Appointed Trustee  
 tant to Deed of  
 on 06/09/2005 as  
 752 of official re-  
 of the Recorder  
 no County, Cali-  
 by: **Daniel Gia-**  
 man, as Trustor  
 st, as Beneficiary  
**PUBLIC AUCTION**  
**HIGHEST BIDDER**  
 vable at time of  
 hey of the United  
 a cashier's check  
 or national bank,  
 a state or federal  
 check drawn by  
 savings and loan  
 ings association,  
 specified in sec-  
 Financial Code  
 o do business in  
 the southside of  
 ce to the Chino  
**3180 Central Av-**  
 all right, title and  
 to and now held  
 Deed of Trust in  
 ted in said Coun-  
 scribing the land  
 fully described  
 Trust. The prop-  
 described is being  
 a street address  
 on designation, if  
 property described  
 d to be: **409 Gar-**  
**City CA 92314.**  
 Trustee disclaims  
 y incorrectness of  
 s and other com-  
 if any, shown  
 will be made, but  
 or warranty, ex-  
 d, regarding title,  
 ncumbrances, to  
 a principal sum of  
 ed by said Deed  
 rest thereon, as  
 ote(s), advances,  
 rms of the Deed  
 ed fees, charges  
 he Trustee and of  
 by said Deed of  
**023.54 (Estimat-**  
 est and additional

## 90 PUBLIC NOTICES

call 877-RSVPADS or 877 778-7237, or visit this internet Web site [www.rsvpforeclosures.com](http://www.rsvpforeclosures.com), using the file number assigned to this case T.S.# 77088. Information about postponements that are very short in duration or that occur close in time to the scheduled sale may not immediately be reflected in the telephone information or on the internet Web site. The best way to verify postponement information is to attend the scheduled sale."  
**RSVP# 288684**  
**Publish: 05/23/12, 05/30/12, 06/06/12**



### Notice of Public Hearing 2010 Urban Water Management Plan

Pursuant to California Water Code (CWC) section 10642 and 10608, a public hearing will be held on the 2010 Urban Water Management Plan (2010 UWMP). The City of Big Bear Lake Department of Water and Power (DWP) will conduct a public hearing on June 26, 2012, at 9:00 am in the Board Room located at 41972 Garstin Dr. Big Bear Lake, California to receive public comment relative to the proposed 2010 UWMP and the water conservation baseline and targets associated with the Water Conservation Act of 2009. The California Water Code requires all urban water suppliers within the state serving 3,000 or more connections to prepare an Urban Water Management Plan and update them every five years, with years ending with 0 and 5. This will be an update to the DWP's 2005 UWMP. The 2010 UWMP complies with recent amendments to the CWC. A copy of the 2010 Final Draft UWMP is available, during normal business hours, at the DWP office. You can also access this document at the DWP website at [www.bbldwp.com](http://www.bbldwp.com). For questions concerning the document, please contact Amelia Ray at (909) 866-5050. Written comments are requested by the close of business on June 15, 2012. Send written comments to: DWP, Attention: Amelia Ray, PO Box 1929, Big Bear Lake, CA 92315.  
**Publish: 6/6/12, 6/13/12**

## 90 PUBLIC NOTICES

sort, by and through its management and/or owners, located at 39950 Seven Oaks Road, Angelus Oaks, California 92305, will sell by auction on **June 26, 2012 at 10:30 a.m.** at former **Space Nos. 39-1/2 and 40 of Seven Oaks Mountain Resort**, the following property on behalf of **Kent Carpenter and Robin Young Carpenter**, the purported owners thereof: Skyline Homes travel trailer, Vehicle Identification Number 1SN-900R2XGA00709, Vehicle Number 7082-0709, Old License Plate Number 2FP3243, New License Plate Number 1LR4223 (exp. 1/10), along with any and all contents therein, which travel trailer is located on what was formerly known as Spaces 39-1/2 and 40 at Seven Oaks Mountain Resort, 39950 Seven Oaks Road, Angelus Oaks, California 92305

**Terms of Sale: Cash or cash equivalent only.** Seven Oaks Mountain Resort, by and through its management and/or owners, reserves the right to bid and hereby notifies all prospective bidders that (i) the amount of its lien is **\$16,296.00 as of May 24, 2012**, (ii) this amount will continue to increase at the rate of \$14.00 per day thereafter, and (iii) this amount will be increased by the costs of the sale, including publication costs. The property is being sold "as is" without any representations or warranties of any kind. Prospective bidders are responsible for determining whether taxes, liens, assessments, registration fees, or any other type of fees or penalties are due and owing to the State of California, the County of San Bernardino, and/or any other governmental entity in connection with the property being sold, and the successful bidder will be responsible for paying any such items after purchasing the property. The successful bidder must remove the property at his/her/its sole expense immediately after completion of the sale unless other arrangements are made, in writing, with the management and/or owners of Seven Oaks Mountain Resort. Sale is subject to cancellation.  
**Publish: 6/6, 6/13/2012**

### NOTICE TO CREDITORS OF BULK SALE (UCC Sec. 6105)

Encrow No. 12-32976

## 90 PUBLIC NOTICES

**PUBLIC NOTICE  
NOTICE OF LIEN SALE**  
 NOTICE IS HEREBY GIVEN that the undersigned intends to sell the personal property described below to enforce a lien imposed on said property pursuant to Chapter 10, Sections 21700-21716 of the Business & Professions Code, Section 2328 of the UCC, Section 535 of the Penal Code and provisions of the Civil Code. The undersigned, **Big Bear Self Storage; 624 W. Country Club Blvd., Big Bear City, CA P.O. Box 326, FAWN-SKIN, CA 92333**, will sell at public sale by competitive bidding to the highest bidder, at the above address at **12:00 PM on Tuesday the 12th day of June 2012** the abandoned miscellaneous good or personal property described below:

#### Tenant/Unit#/Size/Desc.

Brandy Daenell  
 Unit # B 21  
 Unit Size 5X10  
 Miscellaneous items.

Reyna Ybarra  
 Unit # B 11  
 Unit Size 10X15  
 Miscellaneous items.

Landlord reserves the right to bid at sale. Purchased goods are sold "as is" for cash only and must be removed at the time of sale. Sale is subject to cancellation in the event of settlement between landlord and obligated party.

Big Bear Self Storage,  
 624 Country Club Blvd., Big Bear City, CA 92314. (909) 585-2498.  
**Pub: 5/30/2012, 6/6/12**

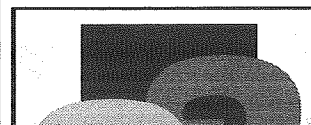
**T.S. No. 11-6399-11 Loan No. 0017804436  
 NOTICE OF  
 TRUSTEE'S SALE**  
 YOU ARE IN DEFAULT UNDER A DEED OF TRUST DATED 5/21/2004. UNLESS YOU TAKE ACTION TO PROTECT YOUR PROPERTY, IT MAY BE SOLD AT A PUBLIC SALE. IF YOU NEED AN EXPLANATION OF THE NATURE OF THE PROCEEDING AGAINST YOU, YOU SHOULD CONTACT A LAWYER. A public auction sale to the highest bidder for cash, cashier's check drawn on a state or national bank, check drawn by a state or federal credit union, or a check drawn by a state or federal savings and loan association, or savings association, or savings bank specified in Section 5102 of the Financial Code and authorized to do business in this

## 90 PUBLIC NOTICES

contacting the county recorder's office or a title insurance company, either of which may charge you a fee for this information. If you consult either of these resources, you should be aware that the same lender may hold more than one mortgage or deed of trust on the property. **NOTICE TO PROPERTY OWNER:** The sale date shown on this notice of sale may be postponed one or more times by the mortgagee, beneficiary, trustee, or a court, pursuant to Section 2924g of the California Civil Code. The law requires that information about trustee sale postponements be made available to you and to the public, as a courtesy to those not present at the sale. If you wish to learn whether your sale date has been postponed, and, if applicable, the rescheduled time and date for the sale of this property, you may call (800) 280-2832 or visit this Internet Web site [www.auction.com](http://www.auction.com), using the file number assigned to this case 11-6399-11. Information about postponements that are very short in duration or that occur close in time to the scheduled sale may not immediately be reflected in the telephone information or on the Internet Web site. The best way to verify postponement information is to attend the scheduled sale. Date: **5/22/2012 THE WOLF FIRM, A LAW CORPORATION 2955 Main Street, 2nd Floor Irvine, California 92614 Foreclosure Department (949) 720-9200 Sale Information Only: (800) 280-2832 Auction.com Frank Escalera, Team Lead P951945**  
**Publish: 5/30, 6/6, 06/13/2012**

**The 2012-13 Proposed Budget for the Bear Valley Unified School District** will be available for inspection from June 13, 2012 to June 20, 2012 during regular business hours, at Bear Valley USD Office, 42271 Moonridge Road, Big Bear Lake, CA 92315.

The 2012-13 Proposed Budget Public Hearing for the Bear Valley Unified School District will be held on June 20, 2012 at 6:30 p.m. at Bear Valley USD, 42271 Moonridge Road, Big Bear Lake, CA 92315.  
**Publish: 6/6/12**



---

**URBAN WATER MANAGEMENT PLAN ACT**

This Page Left Blank Intentionally

**Established:** [AB 797, Klehs, 1983](#)

**Amended:** [AB 2661, Klehs, 1990](#)

[AB 11X, Filante, 1991](#)

[AB 1869, Speier, 1991](#)

[AB 892, Frazee, 1993](#)

[SB 1017, McCorquodale, 1994](#)

[AB 2853, Cortese, 1994](#)

[AB 1845, Cortese, 1995](#)

[SB 1011, Polanco, 1995](#)

[AB 2552, Bates, 2000](#)

[SB 553, Kelley, 2000](#)

[SB 610, Costa, 2001](#)

[AB 901, Daucher, 2001](#)

[SB 672, Machado, 2001](#)

[SB 1348, Brulte, 2002](#)

[SB 1384, Costa, 2002](#)

[SB 1518, Torlakson, 2002](#)

[AB 105, Wiggins, 2004](#)

[SB 318, Alpert, 2004](#)

[SB 1087, Florez, 2005](#)

[SBX7 7, Steinberg, 2009](#)

## **CALIFORNIA WATER CODE DIVISION 6 PART 2.6. URBAN WATER MANAGEMENT PLANNING**

### **CHAPTER 1. GENERAL DECLARATION AND POLICY**

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

- (1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
- (2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
- (3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

- (4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
  - (5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
  - (6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
  - (7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
  - (8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
  - (9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.
- (b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

- (a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
- (b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
- (c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

## **CHAPTER 2. DEFINITIONS**

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

### **CHAPTER 3. URBAN WATER MANAGEMENT PLANS**

#### **Article 1. General Provisions**

10620.

- (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).
- (b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.
- (c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.
- (d)
  - (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.
  - (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.
- (e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.
- (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

- (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.
- (b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.
- (c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

## **Article 2. Contents of Plans**

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

- (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.
- (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:
  - (1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.
  - (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

- (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the

past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

- (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
- (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:
  - (1) An average water year.
  - (2) A single dry water year.
  - (3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

- (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.
- (e)
  - (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:
    - (A) Single-family residential.
    - (B) Multifamily.
    - (C) Commercial.
    - (D) Industrial.
    - (E) Institutional and governmental.
    - (F) Landscape.
    - (G) Sales to other agencies.
    - (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
    - (I) Agricultural.

- (2) The water use projections shall be in the same five-year increments described in subdivision (a).
- (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
  - (1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:
    - (A) Water survey programs for single-family residential and multifamily residential customers.
    - (B) Residential plumbing retrofit.
    - (C) System water audits, leak detection, and repair.
    - (D) Metering with commodity rates for all new connections and retrofit of existing connections.
    - (E) Large landscape conservation programs and incentives.
    - (F) High-efficiency washing machine rebate programs.
    - (G) Public information programs.
    - (H) School education programs.
    - (I) Conservation programs for commercial, industrial, and institutional accounts.
    - (J) Wholesale agency programs.
    - (K) Conservation pricing.
    - (L) Water conservation coordinator.
    - (M) Water waste prohibition.
    - (N) Residential ultra-low-flush toilet replacement programs.
  - (2) A schedule of implementation for all water demand management measures proposed or described in the plan.

- (3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.
  - (4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.
- (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:
- (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.
  - (2) Include a cost-benefit analysis, identifying total benefits and total costs.
  - (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.
  - (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.
- (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

- (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.
- (j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).
- (k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

- (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

- (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.
- (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.
- (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.
- (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.
- (f) Penalties or charges for excessive use, where applicable.
- (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.
- (h) A draft water shortage contingency resolution or ordinance.
- (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

- (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.
- (b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

- (c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.
- (d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
- (e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.
- (f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.
- (g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

## **Article 2.5 Water Service Reliability**

10635.

- (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled

pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

- (b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.
- (c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.
- (d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

### **Article 3. Adoption and Implementation of Plans**

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

- (a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.
- (b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

#### **CHAPTER 4. MISCELLANEOUS PROVISIONS**

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

- (a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.
- (b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water

supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

- (a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.
- (b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

---

**GROUNDWATER BASIN INFORMATION**

This Page Left Blank Intentionally

## Bear Valley Groundwater Basin

- Groundwater Basin Number: 8-9
- County: San Bernardino
- Surface Area: 19,600 acres (30.6 square miles)

### Basin Boundaries and Hydrology

This groundwater basin underlies Bear Valley and is bound by crystalline rocks of the San Bernardino Mountains in southern San Bernardino County. Big Bear Lake, which lies in the western portion of the valley, receives runoff from Grout Creek to the northwest, Van Dusen Canyon to the northeast, Sawmill Canyon to the southeast, Sand Canyon to the southeast, Knickerbocker and Metcalf Creek to the south and North Creek to the southwest. Baldwin Lake, typically dry, lies the northeast portion of the valley, and receives occasional runoff from Van Dusen Canyon to the northwest and Shay Creek to the south (Geoscience 2001). Average annual precipitation to the valley ranges from 23 to 29 inches.

### Hydrogeologic Information

#### ***Water Bearing Formations***

Groundwater in the Bear Valley Groundwater Basin is found primarily in the unconsolidated alluvial deposits. The water-bearing deposits in the valley have been separated into upper, middle, and lower aquifers (Geoscience 1999). The upper and middle aquifers are the primary water producers. In addition, wells completed in underlying bedrock produce as much as 300 gpm (Geoscience 1999).

**Upper Aquifer.** The upper aquifer is composed of Holocene alluvium, which typically consists of sand and gravel deposits that transmit water readily. This aquifer extends through the eastern part of the basin where it reaches more than 200 feet thick, but is thin and unsaturated in the western part of the basin (Geoscience 2001). Groundwater found in this aquifer is generally unconfined to semi-confined (Geoscience 1999).

**Middle Aquifer.** The middle aquifer is primarily composed of older alluvium and older fan deposits containing various amounts of sand, silt, gravel, and clay. This aquifer, which ranges from 150 to more than 800 feet thick, is found throughout the basin (Geoscience 2001). Groundwater found in older fan sediments are generally unconfined to semi-confined in this aquifer; whereas, groundwater in the older alluvial sediments is generally confined under fine sediments (Geoscience 1999).

**Lower Aquifer.** Data are scarce concerning the lower aquifer. The unit consists of gravel, coarse sand, pebbles, and sandy clay and is likely restricted to the eastern part of the basin (Geoscience 2001). One well near Baldwin Lake encountered these deposits about 120 feet thick.

### ***Restrictive Structures***

A groundwater divide exists between Big Bear Lake and Baldwin Lake in the vicinity of the Big Bear Airport (Geoscience 1999). Faults are mapped cutting Pleistocene alluvium, but it is not known if these are barriers to groundwater movement.

### ***Recharge Areas***

Recharge of this basin is likely from percolation of precipitation and runoff and underflow from fractured crystalline rocks.

### ***Groundwater Level Trends***

Groundwater levels within the basin generally correlate with annual fluctuation of precipitation, with peak water levels occurring during winter months and the highest peaks occurring during years with increased annual precipitation. At higher elevations within the basin, seasonal levels fluctuate more so than at lower elevations. Water levels in the basin declined as much as 45 feet between 1984 and 1991 because of reduced precipitation. Water levels returned to their 1983 levels by 1999 (Geoscience 1999). In 1992, groundwater levels dropped 30-feet in response to the Big Bear earthquake, but recovered by 1998 (Geoscience 1999).

### ***Groundwater Storage***

**Groundwater Storage Capacity.** The total storage capacity is estimated at 42,000 af (DWR 1975).

**Groundwater in Storage.** No information is available.

### ***Groundwater Budget (Type A)***

Average inflow of 6,240 af/yr includes percolation of water from precipitation and surface flow minus the affects of evapotranspiration and average outflow of 4,212 af/yr is chiefly from pumping (Geoscience 1999; 2001). Annual groundwater production from 1982 through 1998 ranged from 1,352 to 1,697 af with an average of 1,485 af/yr (GeoScience 1999). Pumping in 2000 was about 2,946 af (Big Bear City DWP 2002).

### ***Groundwater Quality***

**Characterization.** Groundwater within this basin is mainly calcium bicarbonate in character, except for water in the middle aquifer between Baldwin Lake and Big Bear Lake, which tends to have higher concentrations of sodium (Geoscience 2001). TDS content in the eastern portion of the basin ranges from 210 to 360 mg/L without any significant differences between the upper and middle aquifers (Geoscience 1999). In the western part of the basin, TDS concentrations range from 94 to 458 mg/L (Geoscience 2001). Water sampled from 31 public supply wells has an average TDS content of approximately 250 mg/L and a range from 112 to 384 mg/L.

**Impairments.** Water from wells in the eastern part of the basin have had elevated fluoride content, and one well that is screened in all aquifers has

fluoride concentration that has ranged from 6.3 to 9.0 mg/L (Geoscience 2001).

### Water Quality in Public Supply Wells

Constituent Group <sup>1</sup>	Number of wells sampled <sup>2</sup>	Number of wells with a concentration above an MCL <sup>3</sup>
Inorganics – Primary	33	7
Radiological	37	0
Nitrates	32	0
Pesticides	20	0
VOCs and SVOCs	31	0
Inorganics – Secondary	33	5

<sup>1</sup> A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

### Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: to 1,000 gal/min	Average: 500 gal/min (DWR 1975)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

### Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
City of Big Bear DWP	Groundwater levels	57
City of Big Bear DWP	Miscellaneous water quality	57
Department of Health Services and cooperators	Title 22 water quality	52

## Basin Management

---

Groundwater management:	City of Big Bear Department of Water and Power manages the basin under a master plan (Wilson 2002).
Water agencies	
Public	Big Bear City Community Services District, City of Big Bear Department of Water and Power
Private	

---

## References Cited

- Big Bear City, Department of Water and Power. 2002. Internet site: [www.citybigbearlake.com/dwp](http://www.citybigbearlake.com/dwp). 26 June, 2002.
- California Department of Water Resources (DWR). 1975. *California's Ground Water*. Bulletin 118. 135 p.
- GeoScience Support Services, Inc. (Geoscience). 1999. *Re-Evaluation of the Maximum Perennial Yield in the Baldwin Lake Watershed*. 56 p.
- \_\_\_\_\_. 2001. *Re-Evaluation of Maximum Perennial Yield – Big Bear Lake Watershed and a Portion of Baldwin Lake Watershed*. 84 p.
- Wilson, Steve. 2002. City of Big Bear Department of Water and Power. Telephone communication with Tim Ross, Department of Water Resources. 26 June, 2002.

## Additional References

- Brown, G.A. and Fox, R. 1978. *Hydrogeologic Studies, Big Bear Lake – Baldwin Lake Area*. Prepared for the Big Bear City Community Services District and Southern California Water Company.
- California Department of Public Works, Division of Water Resources (DPW). 1934. *South Coastal Basin Investigation: Geology and Ground Water Storage Capacity of Valley Fill*. Bulletin No. 45. 279 p.
- California Department of Conservation, Division of Mines and Geology. 1954. *Geology of Southern California*. Bulletin 170. Volume 1.
- \_\_\_\_\_. 1982. *Geology of the NE San Bernardino Mountains, San Bernardino County, California*.
- Crippen, J.R. 1965. *Natural Water Loss and Recoverable Water in Mountain Basin of Southern California*. United States Geological Survey Professional Paper 417-E.
- Dibblee, T.W. Jr. 1964. *Geologic Map of the Lucerne Valley Quadrangle, San Bernardino, CA*. United States Geological Survey Map I-426.
- Dowdy, D.R., and O'Donnel, T. 1965. *Mathematical Models of Catchment Behavior*. American Society of Civil Engineers. Journal of Hydraulics Division. Volume 91.
- Geoscience. 1991. *Geohydrologic Characteristics and Artificial Recharge Potential of the Sand Canyon Area*. Consultant's Report.
- \_\_\_\_\_. 1992. *Re-Evaluation of Maximum Perennial Yields, Big Bear Ground Water Basin, San Bernardino County, California*. Prepared for Big Bear Lake Department of Water and Power. Consultant's Report.
- \_\_\_\_\_. 2000. *Geohydrologic Investigation of the Moon Camp Area, Big Bear Valley, California*. Prepared for Big Bear Lake Department of Water and Power. Consultant's Report.
- Law Environmental. 1988. *Hydrologic Evaluation of the Shay Meadows Area, Erwin Subarea, Big Bear City, San Bernardino County, California*. Prepared for the Big Bear City Community Services District. Consultant's Report.

- \_\_\_\_\_. 1989. *Exploration Drilling for New Well Sites and an Evaluation of Fluoride Occurrence*. Prepared for the Big Bear City Community Services District. Consultant's Report.
- LeRoy Crandall and Associates. 1987a. *Re-evaluation of Sustained Ground Water Yield, Big Bear Lake Watershed, San Bernardino County, California*. Prepared for Big Bear Lake Department of Water and Power. Consultant's Report.
- LeRoy Crandall and Associates. 1987b. *Re-evaluation of Sustained Ground Water Yield, Baldwin Lake Watershed, San Bernardino County, California*. Prepared for Big Bear Lake Department of Water and Power. Consultant's Report.
- Rogers, T. H. 1967. *Geologic Map of California, San Bernardino Sheet*. Single Map Sheet, Scale 1:250,000.

## Errata

Substantive changes made to the basin description will be noted here.



# Reconnaissance Level Analysis of Alternative Water Sources for the DWP Final Report: March 30, 2010

Groundwater is the only source of supply currently available to the City of Big Bear Lake, Department of Water and Power (DWP). The best estimate of the safe yield of the groundwater basins currently utilized by the DWP is approximately 3,100 af/yr (Ref. 1). The DWP's projected demand will likely exceed this amount within the next 15 – 20 years. At build-out, the DWP is projected to require between 530 af/yr and 950 af/yr of additional water supply (or equivalent reductions in future demand per customer). The higher figure will be used for planning in order to provide for a reasonable contingency.

This report has been prepared by the Alternative Water Source Committee and the staff of the DWP. The purpose of this analysis is to review and evaluate a variety of alternative approaches for meeting the long term water supply needs of the DWP's customers. This analysis is based solely on currently available information, and there was no attempt to develop new information for any of the alternatives.

The alternatives considered were derived from a preliminary list developed in an attempt to cover the fullest possible range of alternatives. In many cases, the individual alternatives on the original list that were similar in nature have been combined in this analysis. For ease of review, the alternative numbers from the original list are included under each alternative considered below.

Each alternative was evaluated based on our best estimate of the following factors: 1) the amount of additional water provided; 2) the capital and O&M costs required for implementation; 3) the technical feasibility; and 4) the political feasibility. To the extent possible these factors were evaluated based on previous studies of water resources within the Big Bear Valley. Where applicable, studies of other areas have also been used. Where little or no information is available, a "best estimate" has been provided and the need for additional study noted. As a reconnaissance level analysis, no specific engineering studies were undertaken to refine the expected costs or effectiveness of each alternative. In some cases only relative costs could be estimated and were used to prioritize different alternatives.

For wells and other facilities where cost estimates were available, the cost per acre-foot was calculated assuming the capital costs of the project would be financed at 5% over 30 years. The resulting annualized capital costs were then added to the estimated annual O&M costs (without any adjustments for inflation) to determine the estimated annual cost of each alternative. The cost per year was then divided by the expected water produced per year to determine the expected cost per acre-foot. Well O&M costs were based on the current DWP average cost of water from wells of \$300 per af/yr.

For pipelines, the capital cost was assumed to be \$150 per foot. Because pipelines have a life expectancy of over three times the financing period, the above method would significantly overestimate the average cost per year over the full life of the pipeline. Consequently, for

pipelines the installation cost was assumed to be financed at 5% for 30 years and the 30 year total cost (installation plus financing) was then divided by the expected life of 100 years to get an average cost per year.

It is recommended that the Board of Commissioners utilize this analysis to select a sub-set of alternatives for further, more detailed analysis. To this end we have prioritized each alternative into three categories:

Priority 1 – definitely worth further study;

Priority 2 – probably worth at least some further study; or

Priority 3 – not worth pursuing at this time, but may become viable in the future.

No alternatives are recommended to be removed from consideration.

### **Alternative 1. Full utilization of the perennial yield of groundwater basins available to the DWP.**

The DWP's most recent estimate of the perennial yield of the groundwater basins available to the DWP and the 5 year average (2005-09) groundwater production by subunit are shown in Table 1.

Table 1. Perennial Yields and Production by Subunit (acre-feet/year)

Subunit	Geoscience Estimate of Perennial Yield (Ref 1)	Estimated Pvt Well Production (Ref 28)	Assumed Available to the DWP (Yld - Wells)	5 year Average Groundwater Production by DWP (Ref 2)
Grout Creek	280	7	273	98.6
Mill Creek	100 – 175	3	97 – 172	12.0 <sup>(a)</sup>
Village	250	3	247	182.0
Rathbone	1,100	135	965	935.3
Division w/ NS "F"	540	2	538	622.1
North Shore w/o NS "F"	240	5	235	18.7
Erwin	890	14	429 <sup>(b)</sup>	592.3
West Baldwin	500-1,000	?	28 – 528 <sup>(c)</sup>	0
TOTAL	3,900 – 4,475	169	2,812 – 3,351	2,460.9

<sup>(a)</sup> Only used during 2007 and 2008 due to water quality issues

<sup>(b)</sup> Assumes 447 af/yr (5yr avg production 2004-08) by BBCCSD (Ref. 30)

<sup>(c)</sup> Assumes 472 af/yr (5yr avg production 2004-08) by BBCCSD (Ref. 30)

The perennial yield estimates shown on Table 1 are based on a variety of different methods and data. For some subunits there is a long history of pumping data, whereas for other subunits there is almost no pumping data at all. While the accuracy of the perennial yield figures shown on Table 1 is unknown, it is clear that they simply represent our best estimate given the available information. As additional data becomes available, they may need to be revised.

A new study has recently been completed that attempts to estimate the average annual amount of water recharged into the valley's groundwater basins using a sophisticated computer model (Ref 29). The model divides the valley into square grids (2 acres each) and estimates the

amount of precipitation and groundwater recharge into each grid. The input for the precipitation model is the 2006 data from the CIMIS precipitation gauge near the golf course in Moonridge. Based on the data from this one point (and one year) it assigns a precipitation value to each grid using a 23 year averaging model and the difference in elevation between the grid point and the Moonridge gauge (Ref. 29, page 3-18 and 3-24). The output from this model indicates significantly higher values for annual recharge than the perennial yield values shown in Table 1 (Ref. 29, Table 3-11). While interesting and potentially valuable in the long term, the DWP has serious concerns about the computer model approach given that it is based on one year's data from one point in the valley. Until the model can be verified by actual precipitation data over a long period of time, we are reluctant to use it for planning purposes. We will, however, take it to be at least one indication that there may be somewhat more groundwater available than previously believed, and that drilling additional wells is a viable alternative for expanding the valley's domestic water supply. We certainly do not believe it provides a sufficient justification for abandoning any of the other alternatives discussed in this analysis.

The DWP continues to believe that one of the most reliable and direct means of establishing the yield of a groundwater basin is through long term pumping of the basin combined with consistent monitoring of groundwater levels as they respond to that pumping. In an attempt to refine the perennial yield estimates shown on Table 1, the DWP has begun a program to "stress" particular subunits on a consistent basis by deliberately exceeding the estimated yield of a particular subunit by roughly 10%. Over an extended period of time this will provide valuable new data to refine the yield estimates. Unfortunately, groundwater basins respond fairly slowly, and it will likely take many years (through both wet and dry periods) before significant revisions to the yield estimates will be possible.

The DWP does not currently have the facilities to fully utilize the perennial yield from all of the subunits shown. It is therefore necessary to evaluate each subunit to determine the ability of the DWP to access the full yield and the new facilities that will be needed.

#### Grout Creek Subunit

The Grout Creek Subunit is primarily composed of fractured granite with a low transmissivity<sup>1</sup>. For this reason traditional domestic wells (with a 50 foot sanitary seal) have limited production capacity in this subunit and depend on the number of fractures that are intercepted by the well and the volume of water in these fractures. A shallow (roughly 50 foot) layer of water bearing alluvium exists in the southeastern portion of this subunit. To utilize water from this shallow layer for domestic purposes, however, requires the installation of a small treatment plant. The DWP is currently working with the regulatory agencies to design an appropriate treatment process to allow this shallow groundwater to be utilized for domestic purposes. The DWP is also in the process of completing a new well in the fractured granite portion of this subunit (Cherokee Well) which is expected to produce 50 gpm and will increase the utilization of this groundwater subunit.

To meet the estimated build-out demand of the Fawnskin system of 204 af/yr (Ref. 28, Table 4-1) we assume will require approximately 2 additional wells into the fractured granite (assuming 50 gpm/well on an 80% duty cycle = 65 af/yr/well) or one additional alluvial well

---

<sup>1</sup> Transmissivity is the rate that groundwater moves within an aquifer.

and treatment system. The estimated cost of constructing 2 additional fractured granite wells (\$750,000 per well) is \$1.5 million. It is assumed that the cost of one alluvial well and treatment system yielding the same amount of water will be comparable to this figure. Using the assumptions described in the introduction this project would produce water for a total cost of \$1,050 per acre-foot (130 af/yr of assumed new capacity).

The estimated build-out demand for the Grout Creek Subunit of 204 af/yr represents 73% of the estimated perennial yield (see Table 1). To utilize the excess yield (roughly 70 af/yr) in other parts of the DWP system would require the construction of an additional well and a pipeline from the eastern edge of Fawnskin to the corner of North Shore Drive and Stanfield Cutoff. The estimated cost of constructing 1 additional well (\$750,000) and roughly 4 miles of pipeline at \$150/foot is \$3.9 million. Using the assumptions described in the introduction this project would produce water for a total cost of \$1,880 per acre-foot (70 af/yr of assumed new capacity). It should be noted that this pipeline could also be used to connect wells in the various North Shore Subunits to the DWP system which would lower the cost per acre-foot for the pipeline.

#### Mill Creek Subunit

The alluvial aquifer in the Mill Creek Subunit is divided vertically into an upper portion with an estimated yield of 100 af/yr and a lower portion with an estimated yield of 75 af/yr. Currently there is one production well in the upper portion and it is estimated that 1 additional well pumping at 50 af/yr will be required to utilize the full yield of the upper portion of this subunit. However, water samples from the existing well have recently indicated levels of Uranium that exceed the Maximum Contaminant Level (MCL) for drinking water. Well head treatment will, therefore, be required before this water can be utilized by DWP customers.

There are currently no production wells in the lower portion of this subunit due to Arsenic levels that exceed the MCL for drinking water. Well-head treatment will be required before the lower portion of the subunit can be utilized by DWP customers.

The cost to fully utilize the Mill Creek Subunit therefore includes 2 additional wells (one in the upper and one in the lower portion) at \$750,000/well and well-head treatment for three wells at \$100,000/well for a total of \$1.8 million capital investment. Using the assumptions described in the introduction plus \$600/af for well-head treatment yields a total cost of \$1,570 per acre-foot (175 af/yr of assumed yield).

#### Village Subunit

The DWP is currently pumping at a rate that is 74% of the full yield of this subunit (5 year average pumping at 182 af/yr vs. an estimated yield of 247 af/yr). The perennial yield of this subunit was, in fact, exceeded for several years resulting in a steady decline in water levels even during wet periods. Pumping within this subunit has been recently reduced and it appears the DWP has the capacity to fully utilize the perennial yield. Therefore, no additional wells or “stress tests” are considered in this subunit.

#### Rathbone Subunit

The ability of the DWP to fully utilize the perennial yield of the Rathbone Subunit has been limited in recent years due to the failure of 3 wells in the Lakeplant well field. The DWP has completed one replacement well (Lakeplant #5) and drilled a second replacement well

(Lakeplant #6) which will be completed in 2010. A third Lakeplant replacement well (Lakeplant #7) is planned for the future. An additional well was drilled towards the middle of this basin near Elm Street (Moonridge well) but it has not been equipped due to low production volume 40 gpm.

The DWP is currently pumping 97% of the estimated yield of the Rathbone Subunit (5 yr avg pumping is 935 af/yr vs. an estimated yield of 965 af/yr – see Table 1). It is believed that drilling and equipping the above described new wells will allow the DWP to fully utilize the perennial yield from this subunit and to “stress test” the Rathbone Subunit by pumping approximately 10%-20% above the estimated yield.

The cost to drill and equip 1 additional well in the Lakeplant well field (\$750,000) and equip the Moonridge well (\$350,000) would be approximately \$1.1 million. Assuming a total production of 250 acre-feet/yr for the two wells and using the assumptions described in the introduction, results in a weighted average cost of \$580 per acre-foot (\$760/af for the Moonridge well and \$540/af for the Lakeplant well #7)..

#### Division and North Shore “F” Subunit

Two wells (#1 and #4) in the Division well field have been removed from production in recent years due to age and Manganese contamination and one new well (McAllister) has been added. A well to replace Division wells #1 and #4 was drilled during 2008 (Division #8) and is scheduled to be operational in 2010.

Even without the proposed replacement well, the DWP is currently pumping roughly 116% of the estimated yield from this subunit (5 yr avg pumping is 622 af/yr vs. an estimated yield of 538 af/yr, see Table 1). To date, no systematic drop in water levels has been observed due to this “stress test” but several years of additional data will be required before a re-evaluation of the yield will be possible. It is worth noting that an average of 834 af/yr (155% of the estimated yield) was pumped from this basin from 1975 through 1990. This level of pumping did appear to result in a general decline in water levels and pumping was reduced to an average of 535 af/yr from 1990 through 2005. The current level of pumping is about 75% of the 1975-1990 pumping rate and will provide additional data to evaluate the yield in the future.

The cost to drill 1 additional well in the Division well field is assumed to be \$750,000. Assuming a total production of 200 acre-feet/yr from this well and using the assumptions described in the introduction, results in a total cost of approximately \$540 per acre-foot. However, if the yield from this subunit is in fact 538 af/yr this new well will provide operational flexibility to meet peak demands but it will not provide additional new water to the DWP system.

#### North Shore Subunit, Area “A”

North Shore Subunit “A” covers the area east of Fawnskin and includes the existing Moon Camp Subdivision and a proposed new residential subdivision. The estimated yield from this Subunit is 29 af/yr (Ref. 28, Table 4-2) and there are currently private wells which utilize approximately 5 af/yr (Ref. 28, Table 4-2). The proposed residential subdivision has drilled a well that appears capable of extracting the remaining estimated yield (24 af/yr) from Subunit “A”. If this well is connected to the Fawnskin system the excess capacity could be available

to the rest of the Fawnskin system (or the rest of the DWP system if the pipeline considered in the Grout Creek Subunit section is constructed).

Assuming the cost to complete the new well is paid by the new residential subdivision, the only cost to utilize any excess yield from Subunit “A” would be the O&M cost which is assumed to be \$300/af.

#### North Shore Subunit, Area “B”

North Shore Subunit “B” consists of mostly land owned by the US Forest Service (USFS). The estimated yield from this subunit is 71 af/yr (Ref. 28, Table 4-2). The yield from this subunit is currently being utilized by the USFS to provide water for the Serrano Campground, Meadows Edge picnic area, and the Discovery Center. Big Bear Shores RV Park, Lighthouse RV Park, and the Observatory also have wells in this subunit. The RV Park is currently utilizing an average of 19 af/yr (Ref. 2- 5 yr average 2005-09), but the other uses are not directly measured. The combined pumping for all uses is estimated to be roughly 3 times the RV Park usage or 51 af/yr. The estimated 20 af/yr excess yield could be accessed by the DWP by drilling an additional well and constructing a pipeline to the corner of North Shore Drive and Stanfield Cutoff. Any new wells in this subunit would have to be located on private land and groundwater studies may be needed to demonstrate that additional groundwater extraction would not adversely affect sensitive habitats.

The cost to drill and equip 1 well in Subunit “B” is assumed to be \$750,000. Assuming a total production of 20 acre-feet/yr for this well and using the assumptions described in the introduction, results in a total cost of approximately \$2,740 per acre-foot. This analysis assumes the proposed relocation of the zoo to the Discovery center will provide a pipeline of sufficient size to get the water from Subunit “B” into the DWP system, and no cost for a pipeline is included. This may not be the case and the DWP may incur some cost to increase the size of the pipeline to handle the extra flow. On the other hand, wells in this area will likely be shallow and the DWP may be able to utilize a smaller drill rig which could reduce the drilling cost for the well.

#### North Shore Subunit, Areas “C” and “D”

North Shore Subunits “C” and “D” extend from roughly Meadows Edge Picnic area to Stanfield Cutoff and is entirely USFS property. The combined estimated yield from these two subunits is 113 af/yr. The Forest Service is very unlikely to allow wells to be drilled on their property due to the possible adverse affect on the sensitive wet meadow habitat in Subunit “C”. It is assumed that none of this yield will be available to the DWP.

#### North Shore Subunit, Area “E”

North Shore Subunit “E” extends from Stanfield Cutoff to just east of the Catholic Church. The estimated yield from this subunit is 27 af/yr (Ref. 28, Table 4-1). There are no known wells in this subunit.

The cost to drill and equip 1 well in Subunit “E” is assumed to be \$750,000. Assuming a total production of 27 acre-feet/yr for this well and using the assumptions described in the introduction, results in a total cost of approximately \$2,110 per acre-foot.

### Erwin Subunit

The yield from the Erwin Subunit is shared between the BBCCSD and the DWP. The BBCCSD has the capacity to pump 500 af/yr from the Erwin subunit (Ref. 29, Table 7-1, wells 2 & 10 and the Greenspot Spring). The average amount actually produced from the Erwin Subunit by the BBCCSD is assumed to be approximately 447 af/yr. The DWP therefore has available approximately 429 af/yr of the yield from the Erwin Subunit.

The data in Table 1 indicate that the total pumping is approximately 118% of the estimated yield (1,053 af/yr vs. the estimated yield of 890 af/yr). To date, no systematic drop in water levels has been observed due to this “stress test”, and it appears that the estimated perennial yield needs to be re-evaluated.

A deep test well completed in the central Sugarloaf area (Magnolia well) indicated the potential for significant additional pumping capacity. This well may or may not be part of the current Erwin Subunit yield estimate because it is located on the border between the Erwin and West Baldwin Subunits. Monitoring data on the Magnolia well have shown near constant water levels for the past three years, and a recent pump test indicated very little interference between the Magnolia well site and the existing Maple production well.

Based on the test well results we estimate that the pumping capacity of the Magnolia well will be in the range of 200-300 gpm and thus provide 250-350 af/yr assuming an 80% duty cycle. However, in order to determine which subunit the well is pumping from, it will be necessary to construct the well; operate it for a period of years; and monitor the groundwater levels within both the Erwin and West Baldwin Subunits.

The cost to drill and equip the Magnolia well is estimated to be \$1 million due to the depth. Operating costs will also be higher due to the greater depth to water and are assumed to be \$450 per acre-foot (50% higher than other wells). With these assumptions and those described in the introduction, we estimate the total cost for water from this well to be \$710 per acre-foot (assuming 250 af/yr of production).

### West Baldwin Subunit

The DWP currently has a small well in the West Baldwin Subunit (Sawmill well) that was drilled in 1956 and is not currently in use. As discussed above, the Magnolia well may also be part of the West Baldwin Subunit. Additional water resources are potentially available from this subunit due to the large uncertainty in the perennial yield estimate. Assuming the Magnolia well is actually in the West Baldwin Subunit and the high end of the perennial yield estimate is correct, the DWP would still need to drill an additional well in this subunit to utilize the 528 af/yr assumed to be available.

The capital and O&M costs for such a well are assumed to be similar to the Magnolia well, \$1 million capital and \$710 per acre-foot O&M.

### Summary.

The DWP is currently pumping at or above the estimated yield in the Village, Division, and Erwin Subunits and is pumping 97% of the estimated yield from the Rathbone Subunit. “Stress tests” are either underway (Division and Erwin) or planned (Rathbone) to further evaluate the current yield estimates. The proposed Magnolia well may or may not be included

in the current yield estimate for the Erwin Subunit. Based on the current estimated yields the only subunits with additional capacity are the Grout Creek, Mill Creek, North Shore, and West Baldwin (assuming the high estimate) Subunits. However, the production records and water level monitoring data seem to indicate that the yield estimates for the Erwin and Division Subunits may need to be revised upward.

The costs for new wells and pipelines needed to fully utilize the estimated yield in each subunit are shown in Table 2. The operating costs for well water were generally taken to be \$300/af. The O&M costs associated with well head treatment were assumed to be \$600/af.

Table 2. Estimated Additional Production Capacity and Costs

Subunit	Estimated Additional Production Capacity (acre-feet/yr)	Capital Cost	Estimated Cost per acre-foot
Grout Creek	167	\$1.5 - \$5.4 million	\$1,050 - \$1,880
Mill Creek	175	\$1.8 million	\$1,570
Village	None		
Rathbone	250 <sup>(a)</sup>	\$1.1 million	\$580
Division	200 <sup>(a)</sup>	\$750,000	\$540
North Shore			
“A”	20	\$0	\$300
“B”	20	\$750,000	\$2,740
“C” and “D”	0	\$0	
“E”	27	\$750,000	\$2,110
Erwin	250 <sup>(b)</sup>	\$1 million	\$710
West Baldwin	250	\$1 million	\$710
TOTAL		\$8.65 - \$12.55 million	\$300 - \$2,740

<sup>(a)</sup> Production capacity will exceed the current estimate of the perennial yield of the subunit

<sup>(b)</sup> Production capacity may be part of the West Baldwin Subunit.

Alternative 1 is clearly technically feasible in the broad sense and the DWP is currently pursuing full utilization of all of the subunits except for Grout Creek, and the North Shore Subunits. New wells in some of the North Shore Subunits are dependent upon protecting sensitive habitat in the area. A portion of the yield from these subunits will likely not be available to the DWP.

Given the fact that this alternative is technically feasible and results in a relatively low cost to produce the water, it is considered a Priority 1 Alternative, and the DWP is already pursuing many of the ideas included under this alternative.

#### **Alternative 1a. Enhanced replenishment of groundwater basins.**

This alternative is labeled “1a” because it is actually an extension of Alternative 1 to include management of the perennial yield of the groundwater subunits available to the DWP.

It should be noted that any enhanced natural recharge project within the Big Bear Lake Watershed would also reduce the amount of surface inflow to Big Bear Lake. Subject to the

terms of the 1977 Judgment (Ref 10), Bear Valley Mutual Water Company (BV Mutual) controls most, if not all, of these surface water rights. However, BV Mutual's water rights were perfected prior to most of the development within the Big Bear Valley. As development has occurred runoff into the lake has actually increased (and groundwater recharge has decreased) due to the construction of roads, parking areas, buildings and other impervious surfaces. It is unclear whether or not the DWP would have a legal right to attempt to recover some of this lost recharge capacity by constructing recharge basins along various tributary streams. A review by legal counsel and discussions with BV Mutual and the BBMWD would be a necessary first step in consideration of any specific project to enhance the natural recharge of groundwater basins within the Big Bear Lake watershed.

Legal issues aside, the remainder of the section will attempt to evaluate the potential for enhanced "natural" recharge into the various groundwater basins available to the DWP. As with Alternative 1, the potential for enhanced "natural" recharge must be evaluated for each subunit separately.

#### Grout Creek Subunit.

The Grout Creek Subunit is primarily composed of fractured granite with a low transmissivity. For this reason, deep wells in this basin have limited production capacity and it is unlikely that enhanced "natural" recharge will be possible. Enhanced recharge into the shallow aquifer may be possible along Grout Creek. Since the current perennial yield estimate exceeds the projected long term demand for the Fawnskin area, increasing the recharge would only be beneficial if a pipeline were constructed to bring the water to other parts of the DWP system.

#### Mill Creek Subunit.

The recharge area for the Mill Creek Subunit is limited but includes Metcalf and Drive-in Creeks on each side of Metcalf Bay and North Creek flowing into Boulder Bay. It may be possible to increase "natural" recharge by constructing recharge basins on some or all of these creeks. Further engineering work would be needed to estimate the effectiveness, construction cost, and maintenance costs of such basins.

#### Village Subunit.

The only two streams in this subunit are Knickerbocker Creek and the intermittent stream flowing down Red Ant Canyon. Most of Knickerbocker Creek is a concrete lined flood control channel with no recharge potential. There may be a small possibility to increase "natural" recharge above the concrete portion in the vicinity of the old Lyn Lift ski area (later known as Snow Forest Ski Area). Further engineering work would be needed to estimate the effectiveness, construction cost, and maintenance costs.

#### Rathbone Subunit.

Rathbone Creek would appear to offer significant opportunities for enhanced "natural" recharge. The upper portion of the Rathbone Subunit (roughly above the confluence of Sand Canyon and Rathbone Creek) is believed to be the primary recharge area for the Rathbone subunit.

The DWP extensively studied the recharge characteristics of Sand Canyon in 1991 and concluded that there is a recharge potential of at least 750 acre-feet/year in this area (Ref 21, page III-4 based on the blending potential only). Bow Canyon and the streambed between

Sand Canyon and Bear Mountain Ski Area (east side of the first hole of the golf course) may also provide opportunities for additional “natural” recharge.

The Sand Canyon site, although not part of the GEOSCIENCE, 2001 study, was also given consideration for artificial recharge based on the results of test drilling conducted previously in this area (Ref 20, page 18). However, this site was removed from consideration by the BBARWA Study Team with concurrence from the Governing Board, prior to further testing due to perceived site access constraints and regulatory issues.

The BBARWA study was probably correct in assuming that the construction of large percolation basins within the existing Sand Canyon stream channel would most likely not be permitted due to flood control constraints. Therefore, removing the Sand Canyon site from consideration for the large scale BBARWA recharge project was probably appropriate. However, some potential clearly exists for enhancing the natural recharge in this area.

The 1991 DWP study assumes the construction of a series of small berms 4 feet in height along the Sand Canyon stream bed above Teton Drive with a total area of about 2.5 acres (Ref 21, Figure IV-8, and page IV-18). Presumably these berms would wash out during major flood events so as to not impede flood flows. Interference with flood flows was, however, not specifically addressed in the report.

An alternative approach would be to simply attempt to slow down the flow of water within the stream channel. The channel would be widened to the extent possible to create a meandering stream with small natural ponds to slow the water flow and allow maximum percolation but not interfere with large flood flows. A trail-way/park could also be included to further enhance the natural character of the stream channel.

The Assessors Parcel Maps (APN's) indicate that the Sand Canyon stream channel consists of three parcels (APN 310-301-19 (5.8 ac), APN 310-672-35 (3.7 ac), and APN 310-392-20 [approx. 3 ac]) totaling approximately 12 acres. The 1991 DWP report (Ref 21, Table III-5) indicates that the long term percolation rate for the Sand Canyon stream channel is between 1.5 feet and 4.5 feet of water per day, but recommends using the minimum figure to be conservative. Assuming the meandering stream channel could be constructed to be roughly 1/3 of the total area (4 acres), the potential volume of water that could be recharged into this area is approximately 6 af/day. At this percolation rate, the Sand Canyon streambed could absorb significantly more than the 750 acre-feet of water per year assumed in the 1991 DWP study (note: the 750 af/yr figure from Ref 21, page III-4 is based on the amount of blending water available and not on the recharge capacity of the Sand Canyon area).

The 1991 DWP report estimated that under existing conditions the natural stream channel allows roughly 33% of the runoff to percolate into the ground and that this results in an average of about 400 af/yr of natural recharge into the Rathbone Subunit (Ref 21, Table III-1). How much the proposed modifications to the streambed might increase the amount of recharge is difficult to estimate, but an increased recharge of 100 to 200 af/yr (25% to 50% increase) might be achievable. Further study would be needed to develop a better estimate of the amount of increased natural recharge and ensure that the design could be approved by the appropriate flood control agency.

The cost to construct a meandering stream (with or without a trail-way/park) within the Sand Canyon streambed is very difficult to estimate without a preliminary design and grading plan. To get a very rough estimate of costs we will assume the need to grade 10,000 cubic yards of material at a cost of \$15 per cubic yard for a total capital cost of around \$150,000. Assuming maintenance costs of \$30,000 per year (20% of capital) and using our standard financial assumptions (including \$300/af to pump the water out of the ground using existing wells) results in a water cost of \$500-\$700 per acre-foot not including the cost of replacing the lost runoff to the lake should this be required. The BBMWD is currently selling water out of the lake to the ski areas for snowmaking for about \$300/af under the assumption that 50% of this water returns to the lake. Assuming none of the water used for enhanced “natural” recharge would return to the lake, we will assume the cost of replacement water, should it be required, would be approximately \$600/af. This would increase the cost for this alternative to \$1,100-\$1,300/af.

Since natural runoff occurs over a relatively short period of time each year, it appears that significant recharge potential exists in the Sand Canyon area above and beyond that which can be achieved using natural runoff. Additional sources of water for recharge into this basin could be lake water and/or purified wastewater. These possibilities will be evaluated under Alternatives 5a and 6a.

#### Division and North Shore “F” Subunits.

Recharge areas for the Division well field are not well defined and there are no significant streams which could be utilized for enhanced “natural” recharge. It is therefore assumed that there are no opportunities for increased “natural” recharge in the Division Subunit.

#### Erwin Subunit.

Extensive studies were undertaken by BBARWA in the past to evaluate the recharge potential of the Erwin Subunit (Ref 20). This study concluded that, for planning purposes, the long term recharge rate for the upper portion of the Erwin Subunit was approximately 1.5 feet/day (Ref 20, page 3). Assuming a recharge area of approximately 5 acres yields a recharge rate of 7.5 af/day. The BBARWA study concluded that during dry climatic periods, up to 1,000 ac/yr of water can be artificially recharged at the Green Spot site (Ref 26, page 5).

The possibilities to enhance natural recharge appear to be limited in the upper Erwin Subunit due to the lack of significant stream flow in the area. No data were found to even estimate the natural stream flow in this area, consequently no realistic estimate of the enhanced natural recharge can be made. However it is believed that during above normal precipitation years, there may be significant flow available for recharge. Actual stream flow measurements should be undertaken to determine the potential available flow. Utilizing the recharge capacity of the upper Erwin Subunit for lake water or purified wastewater will be evaluated separately under Alternatives 5a and 6.

#### Summary.

The costs and possible increased yield from each subunit is shown in Table 3.

Table 3. Estimated Additional Yield and Costs

Subunit	Estimated Additional Yield (acre-feet/yr)	Capital Cost	Annual O&M Costs	Estimated Costs/af
Grout Creek	None			
Mill Creek	??			
Village	??			
Rathbone	100-200 <sup>(a)</sup>	\$150,000	\$30,000	\$500-\$1,300
Division	None			
North Shore	None			
Erwin	?? <sup>(b)</sup>			
West Baldwin	??			
TOTAL				

<sup>(a)</sup> 750 af/yr with an additional water source.

<sup>(b)</sup> 1,000 af/yr with an additional water source.

The full extent of possible increases in the perennial yield by basin management and /or enhanced natural recharge will require further analysis (both engineering and legal) and perhaps years of data collection. Given the low capital cost, however, this is still considered a Priority 1 Alternative.

#### **Alternative 2. Purchase “excess” water from the BBCCSD.**

The BBCCSD has recently released its Water Master Plan (Ref 29) which evaluates their expected future water needs and available supply. The BBCCSD Water Master Plan concluded that “natural recharge to the east portion of the Big Bear Valley groundwater basin appears to be adequate to meet the demands projected for the BBCCSD service area.” (Ref 29, page ES-3). The plan estimates that the adjusted “mean (average) total recharge to groundwater within the Big Bear Valley basin is at least 16,531 ac-ft/yr and could exceed 21,534 ac-ft/yr” (Ref 29, page 3-27). The BBCCSD Water Master Plan does not foresee the need to drill additional wells during the planning period (20 years to 2030).

The above estimated recharge is roughly 4 to 5 times the current production requirements of the DWP and CSD combined (3,877 ac-ft in 2007) and indicates that significant groundwater supplies may be currently untapped within the Big Bear Valley. The report does not, however, indicate that the BBCCSD has excess pumping capacity available that would allow them to sell water to the DWP on a long term basis.

While, as discussed in the introduction, we have some concerns regarding the validity of the computer model used to generate the recharge estimates, drilling additional wells to fully exploit whatever groundwater is available is a Priority 1 project (Alternative 1). Based on the new CSD Water Master Plan, it appears that it may be desirable to expand Alternative 1 to include drilling additional wells outside the current DWP service area. Depending on the location of these new wells, the most cost effective way to bring the water into the DWP system might be through a wheeling agreement with the BBCCSD whereby the DWP pumps into the CSD system and takes delivery at the existing inter-connection between the two

systems at Division Drive. Assuming any new wells drilled by the DWP would be low in fluoride; this alternative becomes nearly identical to the joint blending project discussed below (Alternative 2a).

The capital cost of this alternative would be relatively low and would simply involve improving the inter-connection between the two systems at Division Drive. The O&M costs would depend on the negotiated wheeling price from the BBCCSD. Further discussions with the BBCCSD are needed to explore this alternative.

Given the low capital costs, this is considered a Priority 1 Alternative.

**Alternative 2a. Blend High Fluoride water from the BBCCSD with water from the Erwin or upper West Baldwin Subunits.**

The BBCCSD currently has wells with fluoride levels that exceed the allowed concentration (MCL) of 2 mg/l. To utilize some of this water the BBCCSD has for some time been blending their different sources of water to reduce the average fluoride concentration to acceptable levels. The BBCCSD has also obtained a special exemption from the State Department of Health Services which allows them to deliver water with a fluoride concentration of 3 mg/l (1 mg/l above the MCL). The BBCCSD has recently constructed an additional pipeline that will further enhance their blending capability. However, even with the new pipeline, additional water supplies could be developed if new sources of blending water were available.

The water quality tests for the DWP's proposed Magnolia well indicate that no detectable fluoride is present in the groundwater at this location. Transferring some or all of the water from this well to the BBCCSD's blending tank on Paradise Road and blending it with water at 2 times the MCL from the BBCCSD high fluoride wells effectively doubles the amount of water available for use. The DWP's share of this blended water could then be put into the BBCCSD system and extracted by the DWP at the Division inter-connection between the two systems.

The costs associated with this alternative are difficult to estimate as most of the facilities are either in place or included in other alternatives. A detailed engineering analysis would be necessary to determine if the existing pipelines and pumping facilities within the two water systems are adequate to handle the increased flows from this type of operation. O&M costs would include normal well costs for the magnolia well, the cost to boost the water from the DWP's lowest pressure zone to the higher pressure zones, and any costs associated with the joint blending operation.

On the assumption that most of the capital facilities required for this alternative are already in place, this is considered a Priority 1 Alternative.

**Alternative 3. Import groundwater from Holcomb Valley.**

The DWP does not currently have any wells outside the Big Bear Valley drainage basin. This alternative would involve drilling wells on either private property or federal land in the Holcomb Valley and importing this water to the Big Bear Valley. To our knowledge no

hydrogeologic studies have been conducted in the Holcomb Valley area. Consequently, it is impossible to estimate how much water might be available under this alternative.

The cost of this alternative is also difficult to estimate in that the number of wells is unknown and the length of pipeline required is also unknown.

Regardless whether the wells were drilled on private or public land, the pipeline to transport the water to the DWP system would require a permit from the USFS. The USFS would likely deny a pipeline permit unless it was clearly shown that the pumping would not adversely affect the habitat values in the Holcomb Valley. There will likely also be issues regarding water rights due to an inter-basin transfer and whether or not this area was included in the recent groundwater adjudication of the Mojave River area.

Before this alternative could be seriously considered an analysis of the legal issues and the availability of groundwater in the Holcomb Valley would be required.

Given the complete lack of information and likely opposition by the USFS this is considered a Priority 3 Alternative.

**Alternative 4. Attempt to adjudicate one or more groundwater subunits to limit pumping from private wells.**

If a groundwater basin is in a state of overdraft, California law provides a process for allocating the available yield among all of the parties with groundwater rights within the basin. Once the allocation has been made, a watermaster is typically appointed by the court to oversee the continued use of the basin and annually verify that the parties are complying with the terms of the judgment. The adjudication process is extremely expensive and must involve all parties with groundwater rights in the basin.

Using the DWP's perennial yield estimates (Table 1) the Village, Division, and Erwin Subunits are currently being pumped at or above their estimated yields, and the Rathbone Subunit is being pumped very near its estimated yield. Using the results from the recent BBCCSD Water Master Plan, only the Division Subunit is being pumped above its estimated recharge rate. It does not appear that there is unequivocal evidence that any of valley's groundwater basins are currently in an overdraft condition. The DWP specifically reduced pumping in the Village Subunit to eliminate an apparent overdraft condition. Whether or not it would be possible to undertake an adjudication in anticipation of an overdraft condition is not known and would require legal analysis.

The amount of water that might be saved is impossible to estimate at this time because the actual number of private wells and production per well is unknown. In addition, many private wells are for landscaping purposes and are therefore only sealed in the top 25 feet (DWP wells must be sealed in the top 50 feet). Some fraction of the water produced by private wells is, therefore, likely coming from perched groundwater that is not available to the DWP and not part of the current estimate of the perennial yield. Another issue relates to the right to drill a well. Southern California Water Company (the previous owner/operator of the DWP system) did not normally require the dedication of the groundwater rights as a condition of service. Consequently many more parcels within the DWP service area have the right to drill a well

than have actually drilled them. An adjudication process might actually reduce the percentage of the perennial yield available to the DWP if a significant number of property owners were able to protect their right to drill a well through the adjudication process. A thorough legal evaluation would be required before this alternative could be seriously considered.

Given the uncertainty of its legality and effectiveness, this is considered a Priority 3 Alternative.

#### **Alternative 5. Conjunctive Use of Lake Water and Groundwater.**

Historically, Big Bear Lake and the groundwater basins surrounding the lake have been managed independently of each other. Conjunctive use involves managing these two resources in a coordinated manner attempting to maximize the benefits of each.

Before consideration of a conjunctive use program, it must first be noted that any use of lake water must be approved by the BBMWD and must also be consistent with the terms of the 1977 Judgment. The Judgment protects the water rights of BV Mutual and guarantees them an average of 6,500 acre-feet of water each year (Ref 10). It has been reported that BV Mutual has indicated that they would bring legal action against the BBMWD should they attempt to sell water out of Big Bear Lake for domestic purposes. While the precise legal basis for this claim is unknown, it should be noted that the BBMWD is currently selling water out of the lake for snowmaking purposes. It is estimated by the BBMWD that approximately 50% of the water used for snowmaking during the winter returns to the lake during the spring runoff. The other 50% either percolates into the ground or evaporates into the air and does not return to the lake. The BBMWD has sold water for snowmaking for many years and BV Mutual has never taken legal action. It is not clear why BV Mutual would oppose other uses of lake water when they are guaranteed their full 6,500 af/yr under the Judgment.

It should be noted, that using water out of the lake as part of a conjunctive use program is consistent with the intent of the “physical solution” contained in the 1977 Judgment. It is important to remember that the BBMWD originally sought to condemn BV Mutual’s water rights. The physical solution contained in the 1977 Judgment that settled that condemnation action not only protects BV Mutual’s water rights, but also allows the BBMWD to 1) utilize any excess storage capacity in the lake, and 2) utilize some of Mutual’s water by providing BV Mutual with water from another source up to an average of 6,500 acre-feet per year (which is considered to be the full yield of the lake – Ref 10, pages 7 and 8). Discussions with the BBMWD and BV Mutual and a more extensive legal analysis would be required before this alternative can be considered a viable alternative.

Legal issues aside, the concept of conjunctive use is relatively simple. When the lake level is high, lake water is used for domestic purposes and the groundwater wells are rested and aquifers are allowed to recharge. When lake levels are low, no water is taken from the lake and all of the domestic demand is supplied from groundwater. In between these two extremes, domestic demands are met using a combination of groundwater and lake water. The amount of water coming from each source is based on trying to maximize the use of the groundwater storage capacity and at the same time maximize the recreational values of the lake. This type of program allows for greater utilization of the full storage capacity of the groundwater basins and therefore results in a greater perennial yield. It also reduces the surface area of the lake

when lake levels are high which results in reduced evaporative losses. Conjunctive use, therefore, results in a more efficient use of both the groundwater basins and the storage capacity of the lake. It does, however, result in a somewhat lower lake level particularly during high lake level conditions. The exact impact on lake levels can not be estimated at this time because we do not have access to the BBMWD lake simulation model.

The capital costs involved in a conjunctive use program depend on the method used to incorporate lake water into the DWP's domestic water system. The least cost would be the construction of groundwater recharge facilities which will be considered here (Alternative 5). A more expensive alternative would be to construct a lake water filtration plant which will be considered as a separate alternative (Alternative 5a).

Based on the earlier analysis under alternative 1a, the only subunits available to the DWP with significant recharge capacity appear to be the Rathbone and Erwin Subunits.

#### Rathbone Subunit

As described under Alternative 1a, there appears to be significant underground storage capacity beneath the Sand Canyon stream channel. Alternative 5 would utilize this capacity by pumping lake water through the Bear Mountain snow making pipeline from China Gardens to an appropriate point along the golf course. A new pipeline and a booster pump would have to be constructed to get the water from this point up Sand Canyon to the selected point of recharge, a distance of approximately 6,000 feet. For this analysis it was assumed that water would be discharged above Teton Drive to allow sufficient distance between recharge and extraction. Assuming a cost of \$150 per foot for the pipeline and \$250,000 for a booster pump, yields a total cost of \$1.2 million. O&M costs are assumed to be \$30,000 per year to maintain the recharge facilities in Sand Canyon, \$600/af for water from the lake (twice the price currently paid by the ski areas to account for return flow), \$100/af in pumping costs, and another \$300/af to extract the water using existing wells. Using the assumptions described in the introduction and assuming a recharge rate of 750 af/yr (Ref 21, page IV-18) yields a total cost of \$1,090/af.

#### Erwin Subunit

The analysis of Alternative 1a indicated that excess recharge capacity also exists in the Erwin Subunit. To recharge the upper portion of the Erwin Subunit using water from Big Bear Lake would require a roughly 5-6 mile pipeline and would involve exporting water out of the Big Bear Lake Watershed. Such an export may be opposed by BV Mutual or the San Bernardino Valley Municipal Water District (SBVMWD). However, the basin compensation requirements of the 1977 Judgment should account for and mitigate the effects of such an export on the down stream water interests. Further legal analysis and discussions with the BBMWD, BV Mutual, and others would be required before this can be considered a viable alternative.

Using the data developed by BBARWA (Ref 20 – see Alternative 1a), a 5 acre recharge area in the upper Erwin Subunit should be capable of recharging approximately 1,500 af/yr assuming a 200 day/yr operation. During wet cycles this amount of recharge may not be available. For purposes of this analysis we will assume, on average, only this amount (750 af/yr) can be recharged each year.

The BBARWA study concluded that the cost to purchase and develop the recharge site was \$3.6 million, with annual O&M costs of \$534,000 (Ref 20, page 7-6 and Ref 3). A 5 mile pipeline (\$150/foot) and booster pump (\$250,000) would add roughly \$4.25 million to the capital cost. Using the financing assumptions described in the introduction and assuming a 100 year life for the recharge site and that lake water could be purchased for \$600/af plus another \$100/af in pumping costs and \$300/af to pump the water out of the ground using existing wells yields a total cost of \$1,930 per acre-foot for this alternative (assuming only 750 af/yr can be safely recharged).

While a conjunctive use program appears to be feasible, in order to determine the appropriate operating criteria for such a program it will be necessary to utilize the existing groundwater models in conjunction with the BBMWD's existing lake simulation model.

There is little or no information on the recharge potential of the other groundwater subunits available to the DWP, consequently no additional estimates can be made at this time.

Given the relatively low cost, but uncertain legal and political constraints, conjunctive use through groundwater recharge is considered a Priority 2 alternative.

#### **Alternative 5a. Coordinated use of groundwater and lake water using a water filtration plant.**

A more direct method of using lake water in a conjunctive or coordinated use program would be to construct a lake water filtration plant. A 5 mgd lake water filtration plant was considered in a 1981 water resources report (Ref 11). Since 1981, the Consumer Price Index has approximately doubled but a 5 mgd plant is most likely larger than needed. To get a rough idea of the costs related to this alternative, the prices from the 1981 report were doubled and then multiplied by 2/3's to estimate the costs for a 3.3 mgd water filtration plant in 2008. Using the same financing terms assumed for the other alternatives and assuming the filtration plant would only operate 50% of the time for an average of 1,000 acre-feet per year, the unit cost of this alternative would be \$1,290/acre-foot (including \$600/af to purchase water from the lake). It should be noted that the transmission system costs shown in the 1981 report seem extremely high. The report indicated that it was assumed that lake water would be made available to Southern California Water Co. (now DWP) at China Gardens and to the BBCCSD at Division Drive. Most of the transmission costs may be associated with the assumed BBCCSD connection.

Table 4. Rough Estimates of Water Filtration Costs

Item	Cost
Intake System	\$500,000
Treatment Plant	\$3,700,000
Transmission System	\$4,300,000
Booster Pumps	\$500,000
TOTAL Capital Cost	\$9,000,000
TOTAL Capital w/o Trans. System	\$4,700,000
Average O&M Costs (w/water purchase costs)	\$900,000
Unit Cost/af	\$1,290

The implementation of a conjunctive use program would require the approval of the BBMWD and the concurrence of BV Mutual and the Big Bear Watermaster (see the discussion in the second paragraph under Alternative 1a) that such a program was consistent with the 1977 Judgment.

Significant additional engineering analysis would be required to fully evaluate this alternative as the validity of 27 year old cost figures is clearly questionable. In addition, in order to determine the appropriate operating criteria for a conjunctive use program it will be necessary to link the existing groundwater models to the BBMWD's existing lake simulation model.

Given the high capital cost and uncertain legal and political feasibility this is considered a Priority 3 Alternative.

**Alternative 6. Recharge the Erwin Subunit using purified wastewater.**

This alternative was studied by BBARWA in 2005 and this analysis will be primarily based on those studies. However, in 2007 a nearly identical, although substantially larger, recharge project was constructed by the Orange County Water District. Since actual costs are more reliable than pre-design estimates, the actual construction and O&M costs related to the OCWD project, adjusted to reflect economies of scale, will also be presented and discussed.

Alternative 6 involves treating 500 af/yr of wastewater to drinking water standards, blending it with 500 af/yr of groundwater and then recharging it into the Erwin Lake groundwater basin. It is anticipated that the 50/50 blending requirement may be reduced in the future to allow larger amounts of wastewater to be recharged (i.e. 600 af/yr wastewater and 400 af/yr of groundwater). OCWD currently recharges their purified wastewater without any external blending requirement (ie. existing groundwater is considered adequate to achieve a 50/50 blend).

The BBARWA analysis did not get to the point of a final design, but the wastewater treatment process considered includes the same advanced water purification methods being employed by OCWD (Ref 5). After secondary treatment the water would receive Microfiltration (MF) followed by Reverse Osmosis (RO) and then disinfection by Ultraviolet light and an Advanced Oxidation Process (AOP). This series of processes effectively removes pharmaceuticals and personal care products (PPCP's) (Ref 4). In the end the water is so pure (essentially distilled water) that selected minerals must be added back into the water before it can be recharged into the groundwater basins.

The water purification system constructed by OCWD can not be directly applied to the Big Bear Valley. The significantly smaller size of the plant, colder climate, and lack of an ocean brine disposal pipeline will require some modifications to be realistic for our purposes. The smaller size (1 MGD vs 70 MGD) will mean the loss of some economies of scale. However, to a large extent the components of the treatment system are modular allowing smaller plant sizes to have similar costs. The colder winter climate in the Big Bear Valley will require that most facilities be contained within heated buildings. All of the components in the OCWD plant were constructed inside buildings; consequently the only additional cost will be to heat the buildings during the winter months. Brine disposal during the initial startup phase of the project when treatment flows are small may involve nothing more than injecting the brine into

the export line to Lucerne Valley. As treatment flows increase a separate brine evaporation system would need to be constructed. In addition to the actual water purification system this alternative requires a pipeline from the BBARWA plant to the recharge area as well as purchase and construction of the recharge site itself. Additional wells may also be needed to take full advantage of the recharged water.

The cost analysis contained in the BBARWA final report (Ref 6) assumed processing 1,000 af/yr. The initial 50/50 blending requirement would mean that only 500 af/yr would actually be processed through the plant. This would suggest that a modular design would be required such that a smaller plant be initially constructed that could be expanded when additional water is needed and/or the blending requirement was reduced.

Table 3. DWP Estimated Cost Summary

Facility	Size	Capital Cost	Annual O&M Cost
Treatment and Brine Handling	500 af/yr	\$15,780,000 <sup>(a)</sup>	\$482,000 <sup>(b)</sup>
Greenspot Recharge Site	1,000 af/yr	\$3,600,000	\$534,000
Pipeline and pumping	12-16 inch	\$5,166,000	\$61,000
Property Acquisition		\$2,099,000	\$21,000 <sup>(c)</sup>
Purchase blending water	500 af/yr to start		\$250,000 <sup>(d)</sup>
Legal Services		\$1,000,000	
Environmental		\$1,500,000	
Total		\$29,145,000	\$1,348,000

<sup>(a)</sup> Adjusted to be 2/3 of the costs shown in Ref 6.

<sup>(b)</sup> Adjusted to be 1/2 of the costs shown in Ref 6.

<sup>(c)</sup> Property taxes were not included in BBARWA costs, but would be paid if the DWP owns the property.

<sup>(d)</sup> Assumes a purchase cost of \$500/af.

The cost per acre-foot given in the BBARWA final report is \$4,970 (Ref 7, page 7-10). Using the financing assumptions described in the introduction and the costs from Table 3 (and treating the recharge facility construction costs and property acquisition costs similar to pipeline costs, ie. 100 year lifetime) and assuming 1,000 af/yr of total water, yields a cost per acre-foot of approximately \$3,000. As pointed out by BBARWA in response to an earlier draft of this analysis (Ref 32), assigning a 100 year life to property acquisition, pipelines, and pond construction underestimates the actual cost during the financing period (30 years). Removing this assumption results in a per acre-foot cost of \$3,540. This high cost is partially because of the need to purchase and develop the entire recharge site even though only half of the recharged water is “new”. We have also included the cost of purchasing 500 af/yr of well water to provide the blending required at the start of the project. There may, in fact, not be a need for an additional source of blend water as natural recharge in the Erwin Subunit may be sufficient to meet Department of Health Services (DOHS) blending requirements. The high costs are also partially due to the desire on the part of BBARWA to include sufficient

contingencies to guarantee that actual costs would be less than or equal to the pre-design estimates.

The annualized capital and O&M costs of the OCWD plant (including water treatment, conveyance to the spreading basins, and required monitoring and reporting) were estimated to be \$527 /af in 1997 (Ref 8, page 4-10). The most recent actual costs (less grants and contributions from other agencies) were \$515 per acre-foot (Ref 9), or slightly less than the 1997 estimates. When the total actual capital costs are considered without taking into account the grants and contributions from OCSD and MWD, the most recent actual cost is \$799 per acre-foot (Calculated from Ref 9).

BBARWA originally had federal commitments for grants to help finance the capital construction in the amount of \$15 million (40% of the expected cost). Therefore, taking all of the grant money out of the above calculation is perhaps overly conservative as some grant money will likely be available.

Based on the actual cost data from the OCWD facility it appears that a similar project in Big Bear should cost between \$800 and \$1,000 per acre-foot. The BBARWA estimate is roughly a factor of 5 higher than this estimate. Before this alternative can be realistically evaluated it will be necessary to reconcile these two extremely different cost estimates.

It appears that Alternative 6 is technically feasible based on the success of the OCWD Groundwater Replenishment (GWR) program. However, there is a great deal of public concern regarding this alternative within the Big Bear Valley, and there is an extremely wide variation in the projected costs. Until these issues can be more thoroughly addressed, this alternative will be considered a Priority 2 Alternative.

#### **Alternative 6a. Recharge the Rathbone Subunit (Sand Canyon) using purified wastewater.**

This alternative was not specifically included on the Original List, but is clearly an extension of the concept of recharging purified wastewater into a groundwater basin; consequently we have labeled it Alternative 6a.

This alternative was specifically described in a 1991 DWP report which concluded that up to 750 af/yr of purified wastewater could be recharged in Sand Canyon and meets the Department of Health Services (DOHS) requirements for underground retention time and distance between recharge and extraction (Ref 21, page IV-21 and Figure IV-7). Costs, however, were not addressed in the 1991 DWP report.

Unfortunately, this alternative suffers from the same uncertainty in treatment costs described under Alternative 6 and that discussion will not be repeated here. There are, however, two significant differences between the assumptions in Alternative 6 and this alternative: 1) blending water will not be required as 758 af/yr of natural recharge is presumed to be available (Ref 21, page III-4); and 2) a “skimming” water purification plant is assumed to be constructed on the China Gardens site to treat half the flow (approximately 500 af/yr) from the City of Big Bear Lake (see Alternative 8 for further details). These assumptions should significantly reduce the cost associated with this alternative.

Alternative 6a appears to be technically feasible and would likely be less costly than Alternative 6. However, like Alternative 6, the uncertainty in the cost of treatment makes this a Priority 2 alternative until this issue can be resolved.

**Alternative 7. Snowmaking with reclaimed wastewater.**

The BBMWD currently has contracts with the ski areas for 1,100 acre-feet/year of lake water for snowmaking. Alternative 7 would involve replacing all or a portion of this water with reclaimed wastewater. Replacing a portion of the snowmaking water with reclaimed wastewater would allow an equal amount of lake water to be used for domestic purposes without any impact on lake levels.

The cost of this alternative will depend on the level of wastewater treatment required for snowmaking. If full removal of pharmaceuticals is required, then the water purification costs would be similar to Alternative 6 and the total cost of this alternative would be roughly the combination of Alternatives 5 and 6. Clearly, either directly recharging the purified wastewater (Alternative 6) or implementing conjunctive use (Alternative 5) would be more cost effective than building and operating two treatment plants. If however, the level of treatment can be significantly reduced and pharmaceutical removal is not necessary, this alternative might become cost competitive if the reductions in lake levels associated with Alternative 5 or 5a are considered unacceptable.

Since Big Bear Lake is considered a domestic supply by the regulatory agencies (for Redlands currently and Big Bear Valley potentially), significant reductions in the level of wastewater treatment for snow making purposes will likely not be allowed. The costs of wastewater purification and lake water filtration were estimated in Alternatives 5a and 6. Adding these values together (excluding the cost of purchasing lake water) yields a cost of \$1,500 to \$5,700 per acre-foot.

Given the expected high cost relative to direct groundwater recharge or conjunctive use, this is considered a Priority 3 Alternative.

**Alternative 8. Golf course irrigation with reclaimed water.**

Bear Mountain Golf Course currently uses approximately 120 af/yr of groundwater to irrigate the golf course each summer. By replacing this water with treated wastewater the DWP could increase its pumping from the Rathbone Subunit without exceeding the estimated perennial yield.

Since the quantity is relatively small, a modular wastewater treatment plant could be constructed at the China Gardens site to “skim” and treat 120 af/yr of wastewater and deliver it to the golf course via the existing Bear Mountain snowmaking pipeline. Solids, brine (if generated), and other by-products from the treatment process would be re-injected into the existing wastewater transmission line and pumped to the BBARWA plant.

Under normal circumstances wastewater used for golf course irrigation requires significantly less treatment and there is no need for pharmaceutical removal. However, given the relatively small size of the Rathbone Subunit and public concern regarding possible contamination from

pharmaceuticals, it may be necessary to purify the wastewater to drinking water standards regardless of the use.

No information is currently available on the probable cost of a minimal wastewater treatment system. Consequently, no cost analysis can be performed at this time. However, given the fact that the pipeline is in place and if the treatment requirements could be significantly reduced, the cost of this alternative could be relatively low. If full water purification is required, the costs of this alternative should be comparable to Alternative 6a.

If full water purification is required, the “skimming” wastewater purification plant could also be operated in the winter months to provide approximately 10% of the snowmaking water. This could be used to offset any reductions in lake inflow due to enhanced recharge (Alternative 1a) or allow for lake water to be used for artificial recharge of the groundwater basins during the summer (Alternative 5a). If golf course irrigation were successful, possible additional uses for reclaimed wastewater would include park and school turf irrigation.

Like Alternatives 6 and 6a, the uncertainty in the cost of treatment makes this a Priority 2 Alternative until this issue can be resolved.

#### **Alternative 9. Direct discharge of treated wastewater to Bear Creek.**

The concept is to deliver 1,000 to 2,000 af/yr of treated wastewater via a pipeline below Bear Valley dam to meet a portion of the downstream water demands. This alternative would reduce the BBMWd’s dependence on their contract with SBVWMD to deliver in-lieu water to BV Mutual. One thousand to 1,500 af/yr of lake water would then be removed from the lake for domestic purposes. The presumed advantage of this alternative would be a reduced level of wastewater treatment. The City of Redlands currently recharges approximately 6,700 af/yr of secondarily treated wastewater into the Bunker Hill (Santa Ana River) groundwater basin (Ref 31). If a similar level of treatment were sufficient for this alternative, the only cost would be a pipeline from the BBARWA treatment plant to the Dam. If, however, full water purification, including pharmaceutical removal, is required, this alternative would not be cost competitive with groundwater recharge (Alternative 6 or 6a) as two treatment plants would be required in addition to the construction of the pipeline to the dam.

The driving distance from the BBARWA treatment plant to the dam is 11.3 miles. At \$150/foot a pipeline of this distance would cost roughly \$9 million. Assuming no additional treatment costs and pumping costs of \$100/af, the financing assumptions from the introduction result in a total cost of \$280/af for this alternative. The total costs for this alternative could therefore range from \$280/af to \$5,210 depending on the level of treatment required.

By using this alternative to replace the minimum stream flow releases currently required from Big Bear Dam, a similar amount of water from the lake could be used for domestic purposes with no impact on the lake level. This alternative could therefore significantly reduce the cost of the other alternatives that involve the use of lake water (Alternative 1a, 5, 5a, or 6) and is therefore considered a Priority 2 Alternative.

### **Alternative 10. Direct discharge of treated wastewater to Big Bear Lake.**

This alternative is similar to Alternative 9 only the treated wastewater would be discharged into Stanfield Marsh rather than below the dam. This has the advantage of providing improved habitat conditions in Stanfield Marsh during periods of lower lake levels and would allow some reductions in the need for in-lieu water. It also eliminates the need to construct a pipeline to the dam. Unfortunately, discharging wastewater to BBL will require advanced wastewater treatment for at least nutrient removal and possibly to drinking water standards. No cost estimates were available to further evaluate this alternative.

Given the expected higher cost and public opposition to this alternative, this is considered a Priority 3 Alternative.

### **Alternative 11. Partial diversion of Van Dusen and/or Sawmill Creeks to Big Bear Lake.**

There is currently no means to control flooding around Baldwin Lake during periods of high precipitation. For many years Van Dusen Creek has been diverted to flow totally into Baldwin Lake by an earthen dam across the portion of the drainage channel that flows west into Big Bear Lake. BV Mutual partially diverted the first 10 cfs from Sawmill Creek into Big Bear Lake many years ago. All flows over 10 cfs were diverted to Baldwin Lake. The flows from both creeks are needed to recharge the groundwater basins from which the BBCCSD pumps a significant portion of their water supply. This alternative involves the construction of diversion structures to divert “excess” water flow (ie. flows above what is needed to recharge the Baldwin Subunits) from Van Dusen and/or Sawmill Creeks to BBL for domestic use by both DWP and BBCCSD and use reclaimed wastewater to maintain and/or enhance the wildlife habitat values in Baldwin Lake.

A 1985 BBCCSD report evaluated the potential for capturing “excess” flows from Van Dusen Canyon (Caribou Creek) and (possibly Sawmill Creek and surface water from Shay Meadows as well) before they enter Baldwin Lake (Ref 27, page 2-24). This “excess” water was proposed to be recharged either on BBCCSD property (7.5 acres near Paradise) or via a pump back system along the stream channel. Should this project ever be implemented by the BBCCSD, there would be no “excess” water available for this alternative.

The 1985 BBCCSD report estimated that the average flow from Van Dusen Canyon (Caribou Creek) into Baldwin Lake was 700 af/yr (Ref 27, Table 2-H, 1964-1983 data). If this water were diverted to Big Bear Lake, it could be used to offset the impact on lake levels from any of the other alternatives that involve the use of lake water or surface water tributary to Big Bear Lake.

Since Caribou Creek represents approximately 40% of the inflow into Baldwin Lake, it is very likely that some form of habitat restoration would be needed in Baldwin Lake to mitigate the impact of reduced inflows. This might be accomplished using high fluoride water or treated wastewater from the nearby BBARWA treatment plant. In a letter commenting on an earlier draft of this analysis, the BBARWA Water Committee was unable to concur with an assumption that treated wastewater could be used to mitigate reduced flows to Baldwin Lake.

Without preliminary plans, the cost of this alternative is very difficult to estimate. The primary costs would be the construction of a diversion structure on Van Dusen Canyon to

control the flow in each direction, improvements to the stream channel from the diversion structure to Big Bear Lake, and the cost of mitigating the reduced inflows to Baldwin Lake. If secondary effluent could be used for habitat restoration, the cost of the habitat restoration would be minimal. Higher levels of treatment could significantly increase the costs. Assuming a capital cost of \$500,000 and annual O&M costs of \$50,000 (10%), and using the same financial assumptions used on the other alternatives, the cost of water would be roughly \$100/af.

Besides providing additional water to Big Bear Lake, this alternative would also provide a significant improvement in the valley's ability to control flooding around Baldwin Lake. This benefit alone may be sufficient to justify further consideration of this alternative.

Given the possibly very low costs, potential flood control benefits, but low probability of increased water supply for the DWP this is considered a Priority 2 Alternative.

**Alternative 12. Curtail further development, increase minimum lot size requirements, or otherwise modify the General Plans of the City of Big Bear Lake and/or the County of San Bernardino to reduce the number of potential new services within the DWP service area.**

The total amount of water needed to meet the needs of the DWP's customers is directly proportional to the number of customers. While not a "supplemental water source", any reduction in the number of potential customers will reduce the amount of supplemental water that may be required.

Within this alternative the only option available directly to the DWP would be a connection ban. Less drastic options are available to the City and County through adjustment of their minimum lot size requirements and the density of development contained in their respective general plans. An analysis by the City planning staff (Ref 12) indicates that changing the minimum lot size to 0.5 acre or 1.0 acre would reduce the number of developable lots within the City by 716 units and 783 units respectively. This same analysis showed 1,832 current vacant lots within the City and a potential of 3,288 dwelling units on these lots. If the City chose to limit development to one dwelling per lot, it would reduce the ultimate number of customers to the DWP by 1,456.

Should the City and/or the County decide to modify their general plans and/or their minimum lot size requirements and thereby reduce the maximum number of potential customers within the DWP service area, the DWP will proportionally reduce the maximum projected water demand. Since these are planning issues beyond the scope of the DWP, no further analysis will be undertaken regarding these options at this time.

In the event no supplemental water supply is developed and demands within the DWP service area exceed the available supply, the DWP would have no choice but to impose a connection ban. Given the current estimates of the perennial yields and the current figures on vacant lots, at least half of the existing vacant lots would not be allowed to connect to the DWP system under this scenario. If such a connection ban were made permanent, those lot owners denied building permits may be entitled to compensation. Assuming 1,800 parcels (about half the

existing) and \$50,000 per parcel, a very rough estimate of the cost of this compensation would be \$90 million plus legal costs.

Given that the DWP portion of this alternative (ie. a connection ban) is an extreme and potentially expensive measure, this is considered a Priority 3 Alternative.

**Alternative 13. Eliminate outdoor watering, require Xeriscape landscaping, or require the use of “gray” water for landscaping.**

Watering of landscaped areas is a major use of water during the summer months. Reducing this water use by encouraging Xeriscape techniques and efficient irrigation methods has been a major component of the DWP’s water conservation program. Pushing this program to the extreme would involve prohibiting all outdoor watering except at schools and public parks. It is estimated that this would reduce average usage by approximately 20% or roughly 600 af/yr.

A less extreme alternative would be to require Xeriscape landscaping and prohibit all turf (i.e. remove existing turf) except at schools and public parks. It is estimated that this would reduce average usage by approximately 15% or roughly 450 af/yr.

Another variant of this alternative would be to require all landscaping be watered using “gray” water (ie. water from non-toilet sources within the house). The net effect of this alternative on average water usage would be the same as prohibiting outdoor watering (20% or roughly 600 af/yr). A possible negative side effect would be an increase in personal care products (soap, shampoo, etc.) entering the groundwater.

Under Water Code section 350 the DWP can declare a Water Shortage Emergency and can probably impose the above described restrictions on water use. If this authority were successfully challenged, the DWP would have to seek special legislation to get the authority to impose these restrictions.

It is very likely that a significant portion of the community would react negatively to the imposition of most if not all of these restrictions. Since the DWP can only regulate the use of water delivered through its’ facilities, the implementation of this alternative would likely result in many property owners drilling their own wells. Should this occur it would at least partially defeat the purpose of the restrictions.

Given the low cost but likely community opposition and increase in private wells, this is considered a Priority 3 Alternative.

**Alternative 14. Import state project water.**

The possible importation of state project water has been evaluated at least twice (Ref 11 and 13). The most recent analysis (Ref 13) concluded that “to obtain a long term water supply for the Big Bear Valley, Big Bear would probably have to purchase water from a farmer in Central California (the farmer would then either let his farm land go fallow or switch to a less water intensive crop).” The 2003 letter report (Ref 13) estimates that the cost of purchasing a long-term water supply is \$200 to \$500 per acre-foot. However, given the most recent cut backs in

deliveries (not considered in Ref 13), it will likely be very difficult to negotiate such a purchase.

Assuming a long-term contract could be purchased, it would be necessary to negotiate an agreement to wheel the water to Lake Silverwood and then through the Mojave Water Agency's Morongo Basin Pipeline to Camp Rock Road. From this turnout it would be necessary to construct a pipeline and pumping stations to transport the water to the Big Bear Valley. Ref 13 estimates that the capital cost to construct the necessary facilities to import 2,500 acre-feet per year would be between \$18.1 and \$26 million dollars with annual O&M costs of between \$3.25 and \$4.5 million (2003 dollars). Using the same interest rate and term used in the other alternatives (6.7%, 20 years), results in water costs of between \$2,000 and \$2,500 per acre-foot.

The 1981 report (Ref 11) examined several alternative routes including two from CLAWA and one from MWA. In 1981 dollars the capital costs were \$5 to 5.2 million for the CLAWA alternatives and \$11.1 million for the MWA alternative. Using the same factor of 2 assumed for Alternative 5 to adjust 1981 dollars to 2008 dollars gives capital costs of around \$10 million for the CLAWA alternative and \$22 million for the MWA alternative. It should be noted the CLAWA alternative assumes buying treated water at no extra cost and minimal pumping due to the small change in elevation. If the cost of a treatment plant is included, the capital costs for the CLAWA alternative increases to \$15.4 million in 2008 dollars.

Given the very large capital costs, cutbacks in the State Water Project deliveries and the very small probability of obtaining a State Water Contract this is considered a Priority 3 Alternative.

#### **Alternative 15. Cloud seeding.**

In 2004 the BBMWD proposed a cloud seeding project designed to increase precipitation within the valley by 5% - 15% (Ref 14). During the review process significant local opposition developed and the adequacy of the environmental documentation (Negative Declaration) was questioned. The proposal was eventually dropped when the Santa Ana Regional Water Quality Control Board (SARWQCB) threatened to withdraw grant funds for Total Maximum Daily Load (TMDL) related studies if the project proceeded (Ref 15). The primary concern of the SARWQCB related to the need for completion of hydrological watershed models before beginning any program to increase runoff. The cloud seeding project was officially postponed for one year to allow the watershed models to be completed and the preparation of an EIR. Precipitation in 2005 was well above average, and it appears that no further work was done on the project.

During the hearing process on the 2004 project several opponents presented documentation questioning the efficacy of cloud seeding. Dr. William R. Cotton a professor at Colorado State University was quoted as saying -- "We have seen that with few exceptions, the scientific evidence is not conclusive that cloud seeding is causing the desired results. Cloud seeding may increase precipitation, but it is very modest. It's not going to be a drought breaker" (Ref 18). However, a 2007 article by Dr. Cotton on cloud seeding states -- "Although the amounts of precipitation increase are under debate, a 10 percent increase is conservatively estimated" (Ref 19).

Given the highly variable nature of weather events it is obviously very difficult to determine the direct effect of cloud seeding. Furthermore the wide variation in precipitation from East to West within the Big Bear Valley further complicates any analysis of the effects of cloud seeding. Most of the studies showing the effectiveness of cloud seeding appear to have been done on much larger watersheds. It is, therefore, difficult to estimate how precisely the weather modification contractor would be able to target the Big Bear Valley Watershed, and therefore how effective the program would actually be at increasing precipitation locally.

Another issue of concern was the effect of Silver Iodide on the environment. The BBMWD environmental consultant concluded that Silver Iodide is very stable and would not have a significant effect (Ref 16) whereas the project opponents submitted documents indicating possible long term toxic effects. It is not clear from the documents presented which is correct. If this project were going to be revived, it is clear that a full EIR would have to be prepared to evaluate the environmental effects.

Assuming a cloud seeding program could achieve a 10% increase in precipitation throughout the watershed (the mid-point in the BBMWD estimate and the conservative estimate by Dr. Cotton) it seems reasonable to assume the perennial yield of the groundwater basins would also be increased by 10% for a net increase of approximately 300 acre-feet per year. The proposed cost (in 2004 dollars) was roughly \$167,000 (Ref 17) per year or \$560 per acre-foot. If the BBMWD was still interested in cost sharing this program, the cost per acre-foot might be significantly reduced.

Given the currently available information and the large variation in precipitation throughout the valley, it is difficult to determine how effective a small cloud seeding program might actually be. If only a 2%- 3% increase were achieved within the Bear Valley Watershed, the benefit to the perennial yield would be reduced to between 60 and 90 acre-feet per year and the cost would increase to between \$1,860 and \$2,780 per acre-foot.

Given the high degree of uncertainty in the effectiveness (and therefore cost) of a cloud seeding program and the significant amount of public opposition to the possible adverse environmental effects, this alternative is considered a Priority 3 Alternative.

#### **Alternative 16. Combine all or part of the DWP water system with the BBCCSD.**

This alternative was presented at the joint City Council/DWP meeting but it is not clear how it would create a source of supplemental water for the DWP. The possible transfer of water between the BBCCSD and the DWP is considered under Alternatives 2 and 2a.

#### **Summary and Conclusions**

Based on this reconnaissance level analysis Alternatives 1, 1a, 2, and 2a are considered Priority 1 Alternatives. Alternatives 5, 6, 6a, 8, 9, and 11 are considered Priority 2 Alternatives and the remainder are Priority 3. It is believed that some combination of these alternatives will be able to provide a secure long term water supply for DWP customers including a reasonable

Table 4. Summary of Alternatives

Alternative	Water Provided (acre-feet)	Cost per acre-foot (\$/af)	Technical Feasibility	Political Feasibility	Priority Level
1. Maximize Groundwater	N/A	\$300 - \$2,740	Excellent	Excellent	1
1a. Enhanced Groundwater Recharge	100-200	\$480 - \$1,260	Excellent	Good	1
2. Purchase Excess Water from BBCCSD	0-1,000	Unknown	Excellent	Good	1
2a. Blend low fluoride DWP water with high fluoride BBCCSD water	250-350	Unknown	Excellent	Good	1
3. Import from Holcomb Valley	Unknown	Unknown	Good	Poor	3
4. Groundwater Adjudication	Unknown	Unknown	Poor	Poor	3
5. Conjunctive Use with Lake Water (groundwater recharge)	750-1,500	\$1,090-\$1,450	Excellent	Fair	2
5a. Coordinated Use with Lake Water (filtration plant)	1,000	\$1,290	Excellent	Fair	3
6. Recharge Erwin Lake using Purified Wastewater	1,000	\$800 - \$4,970	Excellent	Fair	2
6a. Recharge Sand Canyon using Purified Wastewater	750	\$800 - \$3,000	Excellent	Fair	2
7. Snowmaking with Purified Wastewater	1,000	\$1,500-\$5,700	Good	Fair	3
8. Golf Course Irrigation with Reclaimed Wastewater	120	\$800 - \$3,000	Excellent	Fair	2
9. Discharge Purified Wastewater to Bear Creek	1,000 – 2,000	\$280 - \$5,250	Excellent	Good	2
10. Discharge of Purified Wastewater to Big Bear Lake	1,000 – 2,000	\$1,500-\$5,700	Excellent	Fair	3
11. Partial Diversion of Van Dusen and/or Sawill Creeks	700	\$100	Good	Good	2
12. Limit Development	Varies w/ Option	Varies w/ Option	Varies w/ Option	Varies w/ Option	3
13. More Extensive Limits on Outdoor Watering	450 – 600	Unknown but likely small	Good to Excellent	Poor	3
14. Import State Project Water	1,000	\$2,000 - \$2,500	Poor	Fair	3
15. Cloud Seeding	50-300	\$550	Fair	Fair	3
16. Combine DWP with BBCCSD	Unknown	Unknown	Unknown	Poor	3

contingency beyond the projected demand at build-out. Alternative 1 may provide the majority of the needed water, but this would require a roughly 30% increase in the perennial yield estimates for the Division and Erwin Subunits and the high estimate for the West Baldwin Subunit. This may be overly optimistic. Clearly, aggressive conservation and more effective

and coordinated use of our surface water and wastewater must also be part of the DWP's long term water management plans.

In most cases the cost estimates developed are extremely rough and are intended for comparison purposes only. They must not be taken too literally. It was the intent of this document to provide a framework for the DWP to evaluate the alternatives using whatever information was available. As we move forward, more precise cost estimates must be developed. It should also be noted that the BBARWA Water Committee does not concur with the cost estimates for the use of purified wastewater and recommends a range of \$6,628/af to \$9,021/af for these costs (not including the cost of blend water or the cost of extraction - Ref. 32). While we agree that BBARWA put forth a considerable effort earlier this decade to evaluate wastewater reclamation, we believe there is a legitimate issue regarding the wide disparity between CH2MHill's pre-design cost estimates and OCWD's actual costs. We can not simply accept CH2MHILL's estimates as totally accurate and reject OCWD's actual costs as completely non-applicable. We continue to believe that our conclusion is appropriate – namely that the two extremely different cost estimates must be reconciled before a realistic conclusion can be reached.

It should also be noted that no alternatives have been dropped from the list. However, the DWP has limited resources and must efficiently focus those resources on the most promising alternatives. To this end, it is recommended that the DWP continue to evaluate only the Priority 1 and 2 Alternatives and postpone any further work on the Priority 3 Alternatives.

## **References**

1. "Technical Memorandum Perennial Yield Update for the City of Big Bear Lake Department of Water and Power Service Area", February 2, 2006, Geoscience Support Services, Inc., Table 2, page 19.
2. DWP Data
3. "Recycled Water Master Plan", Big Bear Area Regional Wastewater Agency, March 2006, CH2MHill,
4. OCWD Groundwater Replenishment System presentation by Mike Marcus April 22, 2008 to the DWP Board.
5. Ref. 3, Figure 6-20, page 6-43.
6. Ref 3, Table 7-7, page 7-9.
7. Ref 3, Page 7-10.
8. Orange County Regional Water Reclamation Project, Project Report, September 1997.
9. Private communication from Greg Woodside, Orange County Water District, "Cost Summary for GWR", June 30, 2008.
10. 1977 Judgment in the case of Big Bear Municipal Water District vs. North Fork Water Company, et al.,
11. Big Bear Valley Water Resources Report and Management Plan for Big Bear City Community Services District and Southern California Water Co., 1981.
12. Presentation by Jim Miller to the joint City Council/DWP meeting, March 3, 2000
13. Letter report prepared by Engineering Resources of Southern California for BBARWA dated March 10, 2003, "Estimated Cost for State Project water"

14. BBWMD Report to Board of Directors, August 19, 2004, Agenda Item 6B and a report from Arlen Huggins, Desert Research Institute, Reno, Nevada titled – “Wintertime Cloud Seeding: Positive Evidence for Snowpack Enhancement”
15. Letter Dated November 2, 2004 from California Regional Water Quality Control Board, Santa Ana Region.
16. Initial Study prepared by Timothy Moore, Risk Sciences, dated 9/28/04
17. Cost Estimate from Atmospheric Incorporated for cloud seeding for the winter of 2004-2006
18. Colorado State University, News and Information, September 10, 2002, “Media Tipsheet: Drought and Wildfire”.
19. “Basic Clouding Seeding Concepts, William R. Cotton, Colorado State University, Southwest Hydrology, March/April 2007, p. 16-17.
20. “Geohydrologic Evaluation of the Artificial Recharge Potential in the Big Bear Valley, California”, Geoscience Support Services, Inc., Oct 1, 2004.
21. “-Report of Waste Discharge/Engineering Report on the Proposed use of Reclaimed Municipal Wastewater for Groundwater Recharge”, Black & Veatch Engineers, July 1991
22. “Status of the Ground Water Replenishment Phase II Project’s Full Scale Preliminary Concepts & Capital Budget Estimates”, Steven C. Schindler, November 11, 2003, Bottom Line Values of Key Parameters.
23. “Feasibility Study of an Artificial Recharge Program for the Division and Lakeplant Well Fields Using Water Potentially Available from Big Bear Lake”, Geoscience, March 1991.
24. Letter dated April 18, 1991 from Jeffery L. Stone, District Engineer, DHS, Office of Drinking Water, to Michael Perry, DWP General Manager.
25. “Water Conservation Plan Report” for the BBCCSD, November 1985, by CM Engineering Associates, page 2-24.
26. Letter dated April 24, 2006 from Dennis Williams, Geoscience, to Steven Schindler, BBARWA General Manager regarding “Summary of Geohydrologic Investigations and Analyses Associated with BBARWA’s Ground Water Artificial Recharge Feasibility Study”).
27. Water Conservation Plan Report for BBCCSD, CM Engineering Associates, November 1985.
28. Water Master Plan, City of Big Bear Lake, Department of Water and Power, CDM, November 2006 ( Table 4-2)
29. Water Master Plan, Big Bear City Community Services District, Daniel B. Stevens & Associates, January 2010.
30. BBCCSD production data, 1997 – 2008
31. [www.ci.redlands.ca.us/utilities/waste\\_water.htm](http://www.ci.redlands.ca.us/utilities/waste_water.htm)
32. Letter dated February 25, 2009 from BBARWA Governing Board to Bill La Haye.
33. Letter dated February 12, 2009 from Michael K. Mayer, BBCCSD General Manager to Bill La Haye

---

**APPENDIX E**  
**2010 WATER QUALITY REPORT**

This Page Left Blank Intentionally



# *2011 Annual Consumer Confidence Report*

*Big Bear Lake / Moonridge  
Water System*

***This report is a summary of the quality of water provided to our customers.***

We test the drinking water quality for many constituents as required by state and federal regulations.

This report shows the results of our monitoring for the period of January 1 - December 31, 2011

***Este informe contiene informacion muy importante sobre su agua potable.***

***Traduzcalo o hable con alguien que lo entienda bien.***

## **Drinking water sources**

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases radioactive material, and can pick up substances resulting from the presence of animals or from human activity. As a result all drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

## **Our sources**

The City of Big Bear Lake Department of Water produces all its water from local ground water sources. There are 35 wells, 17 boosters, and 9 reservoirs with a total storage capacity of 6.5 million gallons in the Big Bear Lake/Moonridge system. We also have 2 permanent back up generators, 4 portable generators, and 2 portable booster pumps. In 2011 there were 501.66 million gallons of water produced out of the Big Bear Lake/Moonridge system.

## **Water System Information**

Throughout the year we have conducted many tests for multiple types of water contaminants. In order to ensure that tap water is safe to drink, the USEPA and the California Department of Public Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

The City of Big Bear Lake Department of Water is located at 41972 Garstin Dr. and is open Monday through Friday from 8:00 a.m. until 4:30 p.m. Our Board of Directors meets on the fourth Tuesday of every month at 9:00 a.m. at our Garstin office. The public is welcome to participate in these meetings. Our phone number is (909) 866-5050. For questions regarding your water quality, ask for Jason Hall, or contact The Environmental Protection Agency's Safe Drinking Water Hotline, (800) 426-4791.

**Contaminants that may be present in source water before we treat it include:**

- **Microbial contaminants**, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- **Radioactive contaminants**, that can be naturally-occurring or be the result of oil and gas production and mining activities.

**Water Quality Data for 2011**

The following tables list all of the drinking water contaminants that were detected during the most recent sampling for the constituent. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, is more than one year old.

**The following terms and abbreviations are used in tables 1, 2, 3 and 4:**

- **Public Health Goal (PHG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
- **Maximum Contaminant Level Goal (MCLG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Environmental Protection Agency (USEPA).
- **Maximum Contaminant Level (MCL)**. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
- **Regulatory Action Level (AL)**: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Nephelometric Turbidity Units (NTU)**. This is a measure of suspended material in water.
- **N/A**: not applicable
- **N/S**: no standard
- **ND**: not detectable at testing limit.
- **ppm**: parts per million or milligrams per liter
- **ppb**: parts per billion or micrograms per liter
- **pCi/L**: picocuries per liter (a measure of radiation)

**Some people may become more vulnerable to contaminants in drinking water than the general population.**

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

**Table 1: Primary Regulated Contaminants**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Microbiological (sampled Weekly)</b>							
Total Coliform Bacteria	2011	# positive	0	3/month	0	0	Naturally present in the environment
<b>Clarity (sampled every 3 years)</b>							
Turbidity	2011	NTU	N/A	5	1.1	ND - 16	Soil runoff
<b>Inorganic Chemicals (sampled every 3 years, except Nitrates which are every year)</b>							
Aluminum	2011	ppb	600	1000	0	ND	Erosion of natural deposits
Arsenic	2011	ppb	4	10	0.5	ND - 7.5	Erosion of natural deposits
Barium	2011	ppb	2000	1000	26	ND - 260	Erosion of natural deposits
Fluoride	2011	ppm	1	2	0.3	ND - 1.2	Erosion of natural deposits
Nitrate (as NO <sub>3</sub> )	2011	ppm	45	45	3.8	ND - 9.9	Erosion of natural deposits
<b>Radioactivity (sampled every 4 years)</b>							
Gross Alpha Activity	2011	pCi/L	0	15	0.3	ND - 3.5	Erosion of natural deposits
Uranium	2011	pCi/L	0.43	20	0	ND	Erosion of natural deposits
<b>Additional Constituents (sampled every 3 years)</b>							
PH	2011	units	N/S	N/S	7.7	7.3 - 8.2	N/A
Hardness (CaCO <sub>3</sub> )	2011	ppm	N/S	N/S	257	86 - 370	N/A
Calcium	2011	ppm	N/S	N/S	52	18 - 78	N/A
Magnesium	2011	ppm	N/S	N/S	25.3	9.1 - 42	N/A
Sodium	2011	ppm	N/S	N/S	14.9	4.4 - 23	N/A
Potassium	2011	ppm	N/S	N/S	2.4	1.1 - 4.4	N/A
Bicarbonate	2011	ppm	N/S	N/S	286	150 - 400	N/A
Total Alkalinity	2011	ppm	N/S	N/S	235	120 - 330	N/A

**Table 2: Secondary Standards**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Secondary Standards (sampled every 3 years)</b>							
Odor-Threshold	2011	units	N/S	3	1	1 - 1	Naturally-occurring organic materials
Chloride	2011	ppm	N/S	500	9	2.5 - 24	Runoff/leaching from natural deposits
Sulfate	2011	ppm	N/S	500	22.7	1.4 - 44	Runoff/leaching from natural deposits
Total Dissolved Solids	2011	ppm	N/S	1000	306	160 - 400	Runoff/leaching from natural deposits
Iron	2011	ppb	N/S	300	126	ND - 1900	leaching from natural deposits
Manganese	2011	ppb	N/S	50	24.5	ND - 340	leaching from natural deposits

Secondary Standards are for contaminants that can affect the taste, odor, or appearance of the drinking water. There are no PHGs, MCLGs, or mandatory standard health effects language for these constituents because secondary MCLs are set on the basis of aesthetics.

**Table 3: Lead and Copper**

<i>Regulated Contaminants</i>	<i>No. of samples collected</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State AL</i>	<i>Detected Level (90th percentile)</i>	<i>No. of sites exceeding AL</i>	<i>Major Sources</i>
<b>Lead and Copper</b> (sampled every 3 years, last sampled in 2011)							
*Lead	20	ppm	0.002	0.015	0	0	Internal corrosion of household water plumbing systems
Copper	20	ppm	0.17	1.3	0.16	0	Internal corrosion of household water plumbing systems

**\*Lead:** If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Big Bear Lake Department of Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.

**Table 4: Unregulated Contaminants**

<i>Unregulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Unregulated Inorganic Chemicals</b> (sampled every 3 years)							
Vanadium	2011	ppb	N/S	50	2.5	ND - 11	Erosion of natural deposits

The City of Big Bear Lake Department of Water sampled over 80 regulated and unregulated chemicals, both organic and inorganic. Unless noted, the other results were non-detectable.

A source water assessment was conducted of the domestic water wells for the City of Big Bear Lake Department of Water "Big Bear Lake / Moonridge system" in December 2001. A copy of the complete assessment may be viewed at the Water Department's office at 41972 Garstin Drive in Big Bear Lake or at the CDHS San Bernardino District office, 464 West 4th Street, Suite 437, San Bernardino, CA 92401. You may also request a summary of the assessment be sent to you by contacting Jason Hall, Production Supervisor, City of Big Bear Lake Department of Water, P.O. Box 1929, Big Bear Lake, CA 92315, or call (909) 866-5050.



*Water Efficiency Makes  
A World of Difference*



# *2011 Annual Consumer Confidence Report*

*Big Bear Shores RV Park  
Water System*

***This report is a summary of the quality of water provided to our customers.***

We test the drinking water quality for many constituents as required by state and federal regulations.

This report shows the results of our monitoring for the period of January 1 - December 31, 2011

***Este informe contiene informacion muy importante sobre su agua potable.***

***Traduzcalo o hable con alguien que lo entienda bien.***

## **Drinking water sources**

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases radioactive material, and can pick up substances resulting from the presence of animals or from human activity. As a result all drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

## **Our sources**

The City of Big Bear Lake Department of Water produces all its water from local ground water sources. There are 2 wells, 3 boosters, and 1 reservoir with a total storage capacity of 125,000 gallons in the Big Bear Shores RV Park system. We also have 4 portable generators, and 2 portable booster pumps. In 2011 there were 5.81 million gallons of water produced out of the Big Bear Shores RV Park system.

## **Water System Information**

Throughout the year we have conducted many tests for multiple types of water contaminants. In order to ensure that tap water is safe to drink, the USEPA and the California Department of Public Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

The City of Big Bear Lake Department of Water is located at 41972 Garstin Dr. and is open Monday through Friday from 8:00 a.m. until 4:30 p.m. Our Board of Directors meets on the fourth Tuesday of every month at 9:00 a.m. at our Garstin office. The public is welcome to participate in these meetings. Our phone number is (909) 866-5050. For questions regarding your water quality, ask for Jason Hall, or contact The Environmental Protection Agency's Safe Drinking Water Hotline, (800) 426-4791.

**Contaminants that may be present in source water before we treat it include:**

- **Microbial contaminants**, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- **Radioactive contaminants**, that can be naturally-occurring or be the result of oil and gas production and mining activities.

**Water Quality Data for 2011**

The following tables list all of the drinking water contaminants that were detected during the most recent sampling for the constituent. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, is more than one year old.

**The following terms and abbreviations are used in tables 1, 2, and 3:**

- **Public Health Goal (PHG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
- **Maximum Contaminant Level Goal (MCLG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Environmental Protection Agency (USEPA).
- **Maximum Contaminant Level (MCL)**. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
- **Regulatory Action Level (AL)**: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Nephelometric Turbidity Units (NTU)**. This is a measure of suspended material in water.
- **N/A**: not applicable
- **N/S**: no standard
- **ND**: not detectable at testing limit.
- **ppm**: parts per million or milligrams per liter
- **ppb**: parts per billion or micrograms per liter
- **pCi/L**: picocuries per liter (a measure of radiation)

**Some people may become more vulnerable to contaminants in drinking water than the general population.**

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

**Table 1: Primary Regulated Contaminants**

Regulated Contaminants	Last Sampled	Unit	Goal (PHG or MCLG)	State MCL	Detected Level (Average)	Detected Level (Range)	Major Sources
<b>Microbiological (sampled monthly)</b>							
Total Coliform Bacteria	2011	# positive	0	2/month	0	0	Naturally present in the environment
<b>Clarity (sampled every 3 years)</b>							
Turbidity	2011	NTU	N/A	5	0.05	ND - 0.1	Soil runoff
<b>Inorganic Chemicals (sampled every 3 years, except Nitrates which are every year)</b>							
*Arsenic	2011	ppb	4	10	17	ND - 34	Erosion of natural deposits
Fluoride	2011	ppm	1	2	0.56	.13 - 1.0	Erosion of natural deposits
Nitrate (as NO <sub>3</sub> )	2011	ppm	1	2	1.35	ND - 2.7	Erosion of natural deposits
<b>Radioactivity (sampled every 4 years)</b>							
Gross Alpha Activity	2011	pCi/L	0	15	0	ND	Erosion of natural deposits
Uranium	2011	pCi/L	0.43	20	0	ND	Erosion of natural deposits
<b>Additional Constituents (sampled every 3 years)</b>							
PH	2011	units	N/S	N/S	8.45	7.9 - 9.0	N/A
Hardness (CaCO <sub>3</sub> )	2011	ppm	N/S	N/S	139.5	39 - 240	N/A
Calcium	2011	ppm	N/S	N/S	21.6	2.2 - 41	N/A
Magnesium	2011	ppm	N/S	N/S	15.8	1.6 - 30	N/A
Sodium	2011	ppm	N/S	N/S	47	10 - 84	N/A
Potassium	2011	ppm	N/S	N/S	1.4	1.3 - 1.6	N/A
Bicarbonate	2011	ppm	N/S	N/S	240	170 - 290	N/A
Carbonate	2011	ppm	N/S	N/S	10.9	1.8 - 20	N/A
Total Alkalinity	2011	ppm	N/S	N/S	210	180 - 240	N/A

**\*Arsenic:** Some people who drink water containing arsenic in excess of the MCL over many years may experience skin damage or circulatory system problems, and may have an increased risk of getting cancer.

**Table 2: Secondary Standards**

Regulated Contaminants	Last Sampled	Unit	Goal (PHG or MCLG)	State MCL	Detected Level (Average)	Detected Level (Range)	Major Sources
<b>Secondary Standards (sampled every 3 years)</b>							
Odor-Threshold	2011	units	N/S	3	1	1 - 1	Naturally-occurring organic materials
Chloride	2011	ppm	N/S	500	3.1	1.8 - 4.4	Runoff/leaching from natural deposits
Sulfate	2011	ppm	N/S	500	8.6	5.3 - 12	Runoff/leaching from natural deposits
Total Dissolved Solids	2011	ppm	N/S	1000	255	250 - 260	Runoff/leaching from natural deposits
Zinc	2011	ppb	N/S	1000	50	ND - 100	leaching from natural deposits

Secondary Standards are for contaminants that can affect the taste, odor, or appearance of the drinking water. There are no PHGs, MCLGs, or mandatory standard health effects language for these constituents because secondary MCLs are set on the basis of aesthetics.

**Table 3: Unregulated Contaminants**

<i>Unregulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Unregulated Inorganic Chemicals (sampled every 3 years)</b>							
Boron	2011	ppb	N/S	1000	100	ND - 200	Erosion of natural deposits
Vanadium	2011	ppb	N/S	50	7.5	ND - 15	Erosion of natural deposits

The City of Big Bear Lake Department of Water sampled over 80 regulated and unregulated chemicals, both organic and inorganic. Unless noted, the other results were non-detectable.

A source water assessment was conducted of the domestic water wells for the City of Big Bear Lake Department of Water "Big Bear Shores RV Park system" in December 2001. A copy of the complete assessment may be viewed at the Water Department's office at 41972 Garstin Drive in Big Bear Lake or at the CDHS San Bernardino District office, 464 West 4th Street, Suite 437, San Bernardino, CA 92401. You may also request a summary of the assessment be sent to you by contacting Jason Hall, Production Supervisor, City of Big Bear Lake Department of Water, P.O. Box 1929, Big Bear Lake, CA 92315, or call (909) 866-5050.



*Water Efficiency Makes  
A World of Difference*



# *2011 Annual Consumer Confidence Report*

*Fawnskin  
Water System*

***This report is a summary of the quality of water provided to our customers.***

We test the drinking water quality for many constituents as required by state and federal regulations.

This report shows the results of our monitoring for the period of January 1 - December 31, 2011

***Este informe contiene informacion muy importante sobre su agua potable.***

***Traduzcalo o hable con alguien que lo entienda bien.***

## **Drinking water sources**

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases radioactive material, and can pick up substances resulting from the presence of animals or from human activity. As a result all drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

## **Our sources**

The City of Big Bear Lake Department of Water produces all its water from local ground water sources. There are 5 wells, 2 boosters, and 3 reservoirs with a total storage capacity of 1.36 million gallons in the Fawnskin system. We also have 4 portable generators, and 2 portable booster pumps. In 2011 there were 25.67 million gallons of water produced out of the Fawnskin system.

## **Water System Information**

Throughout the year we have conducted many tests for multiple types of water contaminants. In order to ensure that tap water is safe to drink, the USEPA and the California Department of Public Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

The City of Big Bear Lake Department of Water is located at 41972 Garstin Dr. and is open Monday through Friday from 8:00 a.m. until 4:30 p.m. Our Board of Directors meet on the fourth Tuesday of every month at 9:00 a.m. at our Garstin office. The public is welcome to participate in these meetings. Our phone number is (909) 866-5050. For questions regarding your water quality, ask for Jason Hall, or contact The Environmental Protection Agency's Safe Drinking Water Hotline, (800) 426-4791.

## **Contaminants that may be present in source water before we treat it include:**

- **Microbial contaminants**, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- **Radioactive contaminants**, that can be naturally-occurring or be the result of oil and gas production and mining activities.

## **Water Quality Data for 2011**

The following tables list all of the drinking water contaminants that were detected during the most recent sampling for the constituent. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, is more than one year old.

### **The following terms and abbreviations are used in tables 1, 2, 3 and 4:**

- **Public Health Goal (PHG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
- **Maximum Contaminant Level Goal (MCLG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Environmental Protection Agency (USEPA).
- **Maximum Contaminant Level (MCL)**. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
- **Regulatory Action Level (AL)**: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Nephelometric Turbidity Units (NTU)**. This is a measure of suspended material in water.
- **N/A**: not applicable
- **N/S**: no standard
- **ND**: not detectable at testing limit.
- **ppm**: parts per million or milligrams per liter
- **ppb**: parts per billion or micrograms per liter
- **pCi/L**: picocuries per liter (a measure of radiation)

### **Some people may become more vulnerable to contaminants in drinking water than the general population.**

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

**Table 1: Primary Regulated Contaminants**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Microbiological (sampled bi-monthly)</b>							
Total Coliform Bacteria	2011	# positive	0	2/month	0	0	Naturally present in the environment
<b>Clarity (sampled every 3 years)</b>							
Turbidity	2011	NTU	N/A	5	0.05	ND - .1	Soil runoff
<b>Inorganic Chemicals (sampled every 3 years, except Nitrates which are every year)</b>							
Arsenic	2011	ppb	4	10	2.1	ND - 8.5	Erosion of natural deposits
Fluoride	2011	ppm	1	2	0.3	ND - 1.1	Erosion of natural deposits
Nitrate (as NO <sub>3</sub> )	2011	ppm	45	45	0.6	ND - 2.7	Erosion of natural deposits
<b>Radioactivity (sampled every 4 years)</b>							
Gross Alpha Activity	2011	pCi/L	0	15	1.3	ND - 5.4	Erosion of natural deposits
Uranium	2011	pCi/L	0.43	20	1.8	ND - 7.5	Erosion of natural deposits
<b>Additional Constituents (sampled every 3 years)</b>							
PH	2011	units	N/S	N/S	7.65	6.3 - 9.7	N/A
Hardness (CaCO <sub>3</sub> )	2011	ppm	N/S	N/S	120	10 - 230	N/A
Calcium	2011	ppm	N/S	N/S	36.4	1.6 - 69	N/A
Magnesium	2011	ppm	N/S	N/S	7.7	ND - 9.4	N/A
Sodium	2011	ppm	N/S	N/S	23.4	11 - 57	N/A
Potassium	2011	ppm	N/S	N/S	1.5	ND - 2.3	N/A
Bicarbonate	2011	ppm	N/S	N/S	164.2	57 - 280	N/A
Carbonate	2011	ppm	N/S	N/S	11.2	ND - 45	N/A
Total Alkalinity	2011	ppm	N/S	N/S	152.5	120 - 230	N/A

**Table 2: Secondary Standards**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Secondary Standards (sampled every 3 years)</b>							
Odor-Threshold	2011	units	N/S	3	1	1 - 1	Naturally-occurring organic materials
Chloride	2011	ppm	N/S	500	7	2.9 - 16	Runoff/leaching from natural deposits
Sulfate	2011	ppm	N/S	500	5.7	2.1 - 8.1	Runoff/leaching from natural deposits
Total Dissolved Solids	2011	ppm	N/S	1000	192	160 - 260	Runoff/leaching from natural deposits

Secondary Standards are for contaminants that can affect the taste, odor, or appearance of the drinking water. There are no PHGs, MCLGs, or mandatory standard health effects language for these constituents because secondary MCLs are set on the basis of aesthetics.

**Table 3: Lead and Copper**

<i>Regulated Contaminants</i>	<i>No. of samples collected</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State AL</i>	<i>Detected Level (90th percentile)</i>	<i>No. of sites exceeding AL</i>	<i>Major Sources</i>
<b>Lead and Copper (sampled every 3 years, last sampled in 2011)</b>							
*Lead	10	ppm	0.002	0.015	0	0	Internal corrosion of household water plumbing systems
Copper	10	ppm	0.17	1.3	1.3	0	Internal corrosion of household water plumbing systems

**\*Lead:** If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Big Bear Lake Department of Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.

**Table 4: Unregulated Contaminants**

<i>Unregulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Unregulated Inorganic Chemicals (sampled every 3 years)</b>							
Vanadium	2011	ppb	N/S	50	1.8	ND - 7.2	Erosion of natural deposits

The City of Big Bear Lake Department of Water sampled over 80 regulated and unregulated chemicals, both organic and inorganic. Unless noted, the other results were non-detectable.

A source water assessment was conducted of the domestic water wells for the City of Big Bear Lake Department of Water, "Fawnskin system" in December 2001. A copy of the complete assessment may be viewed at the Water Department's office at 41972 Garstin Drive in Big Bear Lake or at the CDHS San Bernardino District office, 464 West 4th Street, Suite 437, San Bernardino, Ca 92401. You may also request a summary of the assessment be sent to you by contacting Jason Hall, Production Supervisor, City of Big Bear Lake Department of Water, P.O. Box 1929, Big Bear Lake, Ca 92315, or call (909) 866-5050.



*Water Efficiency Makes  
A World of Difference*



# *2011 Annual Consumer Confidence Report*

*Lake William  
Water System*

***This report is a summary of the quality of water provided to our customers.***

We test the drinking water quality for many constituents as required by state and federal regulations.

This report shows the results of our monitoring for the period of January 1 - December 31, 2011

***Este informe contiene informacion muy importante sobre su agua potable.***

***Traduzcalo o hable con alguien que lo entienda bien.***

## **Drinking water sources**

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases radioactive material, and can pick up substances resulting from the presence of animals or from human activity. As a result all drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

## **Our sources**

The City of Big Bear Lake, Department of Water produces all its water from local ground water sources. There are 3 wells, and 1 reservoir with a total storage capacity of 160,000 gallons in the Lake William system. We also have 4 portable generators, and 2 portable booster pumps. In 2011 there were 5.82 million gallons of water produced out of the Lake William system.

## **Water System Information**

Throughout the year we have conducted many tests for multiple types of water contaminants. In order to ensure that tap water is safe to drink, the USEPA and the California Department of Public Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

The City of Big Bear Lake, Department of Water is located at 41972 Garstin Dr. and is open Monday through Friday from 8:00 a.m. until 4:30 p.m. Our Board of Directors meet on the fourth Tuesday of every month at 9:00 a.m. at our Garstin office. The public is welcome to participate in these meetings. Our phone number is (909) 866-5050. For questions regarding your water quality, ask for Jason Hall, or contact The Environmental Protection Agency's Safe Drinking Water Hotline, (800) 426-4791.

**Contaminants that may be present in source water before we treat it include:**

- **Microbial contaminants**, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- **Radioactive contaminants**, that can be naturally-occurring or be the result of oil and gas production and mining activities.

**Water Quality Data for 2011**

The following tables list all of the drinking water contaminants that were detected during the most recent sampling for the constituent. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, is more than one year old.

**The following terms and abbreviations are used in tables 1, 2, 3 and 4:**

- **Public Health Goal (PHG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
- **Maximum Contaminant Level Goal (MCLG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Environmental Protection Agency (USEPA).
- **Maximum Contaminant Level (MCL)**. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
- **Regulatory Action Level (AL)**: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Nephelometric Turbidity Units (NTU)**. This is a measure of suspended material in water.
- **N/A**: not applicable
- **N/S**: no standard
- **ND**: not detectable at testing limit.
- **ppm**: parts per million or milligrams per liter
- **ppb**: parts per billion or micrograms per liter
- **pCi/L**: picocuries per liter (a measure of radiation)

**Some people may become more vulnerable to contaminants in drinking water than the general population.**

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

**Table 1: Primary Regulated Contaminants**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Microbiological (sampled monthly)</b>							
Total Coliform Bacteria	2011	# positive	0	2/month	0	0	Naturally present in the environment
<b>Clarity (sampled every 3 years)</b>							
Turbidity	2011	NTU	N/A	5	0.2	.1 - .4	Soil runoff
<b>Inorganic Chemicals (sampled every 3 years, except Nitrates which are every year)</b>							
Fluoride	2011	ppm	1	2	1.22	1.0 - 2.5	Erosion of natural deposits
Nitrate (as NO <sub>3</sub> )	2011	ppm	45	45	17.6	2.0 - 37	Erosion of natural deposits
<b>Radioactivity (sampled every 4 years)</b>							
Gross Alpha Activity	2011	pCi/L	0	15	5.7	4.6 - 7.5	Erosion of natural deposits
Uranium	2011	pCi/L	0.43	20	7.3	5.4 - 10.0	Erosion of natural deposits
<b>Additional Constituents (sampled every 3 years)</b>							
PH	2011	units	N/S	N/S	7.6	7.5 - 7.8	N/A
Hardness (CaCO <sub>3</sub> )	2011	ppm	N/S	N/S	136	120 - 170	N/A
Calcium	2011	ppm	N/S	N/S	39.6	34 - 48	N/A
Magnesium	2011	ppm	N/S	N/S	11.3	8 - 14	N/A
Sodium	2011	ppm	N/S	N/S	24.6	19 - 31	N/A
Potassium	2011	ppm	N/S	N/S	3.1	2.1 - 5.2	N/A
Bicarbonate	2011	ppm	N/S	N/S	156	150 - 160	N/A
Total Alkalinity	2011	ppm	N/S	N/S	126	120 - 130	N/A

**Table 2: Secondary Standards**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Secondary Standards (sampled every 3 years)</b>							
Odor-Threshold	2011	units	N/S	3	1	1 - 1	Naturally-occurring organic materials
Chloride	2011	ppm	N/S	500	19.3	17 - 22	Runoff/leaching from natural deposits
Sulfate	2011	ppm	N/S	500	15.6	14 - 16	Runoff/leaching from natural deposits
Total Dissolved Solids	2011	ppm	N/S	1000	236.6	200 - 280	Runoff/leaching from natural deposits

Secondary Standards are for contaminants that can affect the taste, odor, or appearance of the drinking water. There are no PHGs, MCLGs, or mandatory standard health effects language for these constituents because secondary MCLs are set on the basis of aesthetics.

**Table 3: Lead and Copper**

<i>Regulated Contaminants</i>	<i>No. of samples collected</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State AL</i>	<i>Detected Level (90th percentile)</i>	<i>No. of sites exceeding AL</i>	<i>Major Sources</i>
<b>Lead and Copper (sampled yearly, Last sampled in 2011)</b>							
*Lead	10	ppm	0.002	0.015	ND	0	Internal corrosion of household water plumbing systems
*Copper	10	ppm	0.17	1.3	1.3	2	Internal corrosion of household water plumbing systems

\*Lead: If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Big Bear Lake Department of Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.

\*Copper: Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time may experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years may suffer liver or kidney damage. People with Wilsons Disease should contact their personal doctor.

**Table 4: Unregulated Contaminants**

<i>Unregulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Unregulated Inorganic Chemicals (sampled every 3 years)</b>							
<i>(There were no Unregulated Inorganic Contaminants Detected in 2011 when last sampled)</i>							

The City of Big Bear Lake Department of Water sampled over 80 regulated and unregulated chemicals, both organic and inorganic. Unless noted, the other results were non-detectable.

A source water assessment was conducted of the domestic water wells for the City of Big Bear Lake Department of Water, "Lake William system" in December 2001. A copy of the complete assessment may be viewed at the Water Department's office at 41972 Garstin Drive in Big Bear Lake or at the DHS San Bernardino District office, 464 West 4th Street, Suite 437, San Bernardino, Ca 92401. You may also request a summary of the assessment be sent to you by contacting Jason Hall, Production Supervisor, City of Big Bear Lake Department of Water, P.O. Box 1929, Big Bear Lake, Ca 92315, or call (909) 866-5050.



*Water Efficiency Makes  
A World of Difference*



# *2011 Annual Consumer Confidence Report*

*Sugarloaf / Erwin Lake  
Water System*

***This report is a summary of the quality of water provided to our customers.***

We test the drinking water quality for many constituents as required by state and federal regulations.

This report shows the results of our monitoring for the period of January 1 - December 31, 2011

***Este informe contiene informacion muy importante sobre su agua potable.***

***Traduzcalo o hable con alguien que lo entienda bien.***

## **Drinking water sources**

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases radioactive material, and can pick up substances resulting from the presence of animals or from human activity. As a result all drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

## **Our sources**

The City of Big Bear Lake Department of Water produces all its water from local ground water sources. There are 6 wells, 9 boosters, and 1 reservoir with a total storage capacity of 500,000 gallons in the Sugarloaf/Erwin Lake system. We also have 4 portable generators, and 2 portable booster pumps. In 2011 there were 163.58 million gallons of water produced out of the Sugarloaf/Erwin Lake system.

## **Water System Information**

Throughout the year we have conducted many tests for multiple types of water contaminants. In order to ensure that tap water is safe to drink, the USEPA and the California Department of Public Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

The City of Big Bear Lake Department of Water is located at 41972 Garstin Dr. and is open Monday through Friday from 8:00 a.m. until 4:30 p.m. Our Board of Directors meet on the fourth Tuesday of every month at 9:00 a.m. at our Garstin office. The public is welcome to participate in these meetings. Our phone number is (909) 866-5050. For questions regarding your water quality, ask for Jason Hall, or contact The Environmental Protection Agency's Safe Drinking Water Hotline, (800) 426-4791.

**Contaminants that may be present in source water before we treat it include:**

- **Microbial contaminants**, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
- **Radioactive contaminants**, that can be naturally-occurring or be the result of oil and gas production and mining activities.

**Water Quality Data for 2011**

The following tables list all of the drinking water contaminants that were detected during the most recent sampling for the constituent. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The state requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, is more than one year old.

**The following terms and abbreviations are used in tables 1, 2, 3 and 4:**

- **Public Health Goal (PHG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.
- **Maximum Contaminant Level Goal (MCLG)**: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the Environmental Protection Agency (USEPA).
- **Maximum Contaminant Level (MCL)**. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
- **Regulatory Action Level (AL)**: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
- **Nephelometric Turbidity Units (NTU)**. This is a measure of suspended material in water.
- **N/A**: not applicable
- **N/S**: no standard
- **ND**: not detectable at testing limit.
- **ppm**: parts per million or milligrams per liter
- **ppb**: parts per billion or micrograms per liter
- **pCi/L**: picocuries per liter (a measure of radiation)

**Some people may become more vulnerable to contaminants in drinking water than the general population.**

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

**Table 1: Primary Regulated Contaminants**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Microbiological (sampled Weekly)</b>							
*Total Coliform Bacteria	2011	# positive	0	2/month	0	0	Naturally present in the environment
<b>Clarity (sampled every 3 years)</b>							
Turbidity	2011	NTU	N/A	5	0.1	ND - 0.1	Soil runoff
<b>Inorganic Chemicals (sampled every 3 years, except Nitrates which are every year)</b>							
Fluoride	2011	ppm	1	2	0.15	.11 - .18	Erosion of natural deposits
Nitrate (as NO3)	2011	ppm	45	45	2.9	ND - 6.1	Erosion of natural deposits
<b>Radioactivity (sampled every 4 years)</b>							
Gross Alpha Activity	2011	pCi/L	0	15	0	ND	Erosion of natural deposits
Uranium	2011	pCi/L	0.43	20	0	ND	Erosion of natural deposits
<b>Additional Constituents (sampled every 3 years)</b>							
PH	2011	units	N/S	N/S	7.6	7.4 - 7.9	N/A
Hardness (CaCO3)	2011	ppm	N/S	N/S	186	160 - 220	N/A
Calcium	2011	ppm	N/S	N/S	40.8	36 - 49	N/A
Magnesium	2011	ppm	N/S	N/S	19.4	18 - 23	N/A
Sodium	2011	ppm	N/S	N/S	10.3	8.6 - 12	N/A
Potassium	2011	ppm	N/S	N/S	1.7	1.6 - 2.0	N/A
Bicarbonate	2011	ppm	N/S	N/S	214	190 - 250	N/A
Total Alkalinity	2011	ppm	N/S	N/S	176	150 - 210	N/A

**Table 2: Secondary Standards**

<i>Regulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Secondary Standards (sampled every 3 years)</b>							
Odor-Threshold	2011	units	N/S	3	1	1 - 1	Naturally-occurring organic materials
Chloride	2011	ppm	N/S	500	5.2	2.4 - 6.4	Runoff/leaching from natural deposits
Sulfate	2011	ppm	N/S	500	12.8	9.4 - 17	Runoff/leaching from natural deposits
Total Dissolved Solids	2011	ppm	N/S	1000	232	210 - 260	Runoff/leaching from natural deposits

Secondary Standards are for contaminants that can affect the taste, odor, or appearance of the drinking water. There are no PHGs, MCLGs, or mandatory standard health effects language for these constituents because secondary MCLs are set on the basis of aesthetics.

**Table 3: Lead and Copper**

<i>Regulated Contaminants</i>	<i>No. of samples collected</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State AL</i>	<i>Detected Level (90th percentile)</i>	<i>No. of sites exceeding AL</i>	<i>Major Sources</i>
<b>Lead and Copper</b> (sampled every 3 years, last sampled in 2011)							
*Lead	20	ppm	0.002	0.015	0	0	Internal corrosion of household water plumbing systems
Copper	20	ppm	0.17	1.3	0.6	1	Internal corrosion of household water plumbing systems

**\*Lead:** If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Big Bear Lake Department of Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.

**Table 4: Unregulated Contaminants**

<i>Unregulated Contaminants</i>	<i>Last Sampled</i>	<i>Unit</i>	<i>Goal (PHG or MCLG)</i>	<i>State MCL</i>	<i>Detected Level (Average)</i>	<i>Detected Level (Range)</i>	<i>Major Sources</i>
<b>Unregulated Inorganic Chemicals</b> (sampled every 3 years)							
<i>(There were no Unregulated Inorganic Contaminants Detected in 2011 when last sampled)</i>							

The City of Big Bear Lake Department of Water sampled over 80 regulated and unregulated chemicals, both organic and inorganic. Unless noted, the other results were non-detectable.

A source water assessment was conducted of the domestic water wells for the City of Big Bear Lake Department of Water, "Sugarloaf/Erwin Lake system" in December 2001. A copy of the complete assessment may be viewed at the Water Department's office at 41972 Garstin Drive in Big Bear Lake or at the CDHS San Bernardino District office, 464 West 4th Street, Suite 437, San Bernardino, Ca 92401. You may also request a summary of the assessment be sent to you by contacting Jason Hall, Production Supervisor, City of Big Bear Lake Department of Water, P.O. Box 1929, Big Bear Lake, Ca 92315, or call (909) 866-5050.



*Water Efficiency Makes  
A World of Difference*

**APPENDIX F**

---

**ORDINANCES AND RESOLUTIONS**

This Page Left Blank Intentionally

**RESOLUTION NO. DWP 2005-02**

**A RESOLUTION OF THE BOARD OF COMMISSIONERS  
OF THE DEPARTMENT OF WATER & POWER  
OF THE CITY OF BIG BEAR LAKE  
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA  
APPROVING REVISED LANDSCAPING REGULATIONS  
WITHIN THE BIG BEAR VALLEY**

WHEREAS, the Board of Commissioners adopted Resolution No. DWP 2004-08 approving specific guidelines for the planning and installation of appropriate water-conserving landscapes within the Department of Water & Power's service area in the Big Bear Valley; and

WHEREAS, a revised version of said guidelines has been proposed for adoption by the City Council of the City of Big Bear Lake in the form of an ordinance for inclusion into the Municipal Code of the City of Big Bear Lake; and

WHEREAS, the Board of Commissioners wishes to approve the proposed Landscaping Regulations in the form set forth in the draft ordinance attached hereto, to be applied throughout that portion of the Department's service area which is located within the Big Bear Valley, regardless of whether said area is also located within the boundaries of the City of Big Bear Lake;

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of the Department of Water & Power of the City of Big Bear Lake does hereby approve and adopt the Landscaping Regulations set forth in the proposed ordinance attached hereto to be applied as a condition of water service from the Department of Water & Power throughout that portion of the Department's service area which is located within the Big Bear Valley, regardless of whether said area is also located within the corporate boundaries of the City of Big Bear Lake.

BE IT FURTHER RESOLVED that said Landscaping Regulations shall become effective concurrently with the effective date of the ordinance attached hereto and shall supersede all other guidelines and regulations previously adopted by this Board of Commissioners and inconsistent therewith.

PASSED, APPROVED, and ADOPTED this 22<sup>nd</sup> day of February, 2005.

AYES: Conley, Speyers, Willey  
NOES: None  
ABSENT: Herrick, Etter

Feb 22, 2005  
DATE

Susan Conley  
Susan Conley, Treasurer  
DWP Board of Commissioners

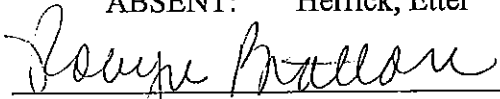
ATTEST:  
Robyn Bratton  
ROBYN BRATTON  
Secretary to the Board of Commissioners

## CERTIFICATION

STATE OF CALIFORNIA           )  
COUNTY OF SAN BERNARDINO)  
CITY OF BIG BEAR LAKE       )

I, Robyn Bratton, Secretary to the Board of Commissioners of the Department of Water & Power of the City of Big Bear Lake, California, do hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2005-02, was duly passed and adopted by the said Board and attested to by the Secretary of said Board, all at a Regular Meeting of the said Board held on the 22nd day of February, 2005, that the same was so passed and adopted by the following vote:

AYES:           Conley, Speyers, Willey  
NOES:           None  
ABSENT:        Herrick, Etter

  
Robyn Bratton  
Secretary to the Board

(SEAL)

**ORDINANCE NO. 2005-348**

**AN ORDINANCE OF THE CITY OF BIG BEAR LAKE, COUNTY OF  
SAN BERNARDINO, STATE OF CALIFORNIA, AMENDING CHAPTER  
15.66 OF ARTICLE XV OF THE BIG BEAR LAKE MUNICIPAL CODE  
DEALING WITH THE REGULATION OF LANDSCAPING**

**WHEREAS**, the Department of Water and Power of the City of Big Bear Lake (the "Department") has undertaken to supply existing customers with water including, most importantly, water for human consumption, sanitation, and fire protection; and

**WHEREAS**, the total water supply available to the Department Service Area is dependent upon local rainfall and snow melt percolation into local ground water sources, which are limited; and

**WHEREAS**, recent periods of insufficient natural ground water recharge in the Big Bear Valley make it necessary for the Department to implement water conservation measures; and

**WHEREAS**, water usage and demand by Department customers has substantially increased over the past ten years, especially as a result of landscaping; and

**WHEREAS**, the estimate of perennial yield of the aquifers, water usage by customers, and anticipated growth of the community indicate that water demand may exceed supply within the next ten years; and

**WHEREAS**, the City Council of the City of Big Bear Lake ("City") desires to maintain the Department's water resources for human consumption, sanitation, and fire protection and reduce wasteful and inefficient consumption of water; and

**WHEREAS**, the City Council of the City of Big Bear Lake finds inefficient landscaping practices disproportionately drains the water resources of the Department; and

**WHEREAS**, the City Council of the City of Big Bear Lake finds that Chapter 15.66 must be amended to adequately address inefficient landscaping practices; and

**WHEREAS**, pursuant to Article XI, Section 7 of the California Constitution, the City is authorized to make and enforce within its limits all local, police, sanitary, and other ordinances and regulations not in conflict with the general laws of the State.

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF BIG BEAR LAKE DOES  
ORDAIN AS FOLLOWS:**

**SECTION 1.** Chapter 15.66 of Article XV of the City of Big Bear Lake Municipal Code is hereby amended in its entirety to read as follows:

## Chapter 15.66

## LANDSCAPING REGULATIONS

## Sections:

15.66.010	Purpose.
15.66.020	Application; Exception.
15.66.030	Goals and Objectives.
15.66.040	Definitions.
15.66.050	Water-Use Policies and Requirements.
15.66.060	Nonessential Water Use.
15.66.070	Turf Installations.
15.66.080	Water Feature Installation.
15.66.090	Landscape Plans and Permits.
15.66.100	New Landscape Regulations.
15.66.110	Regulations for Retrofitting Landscapes.
15.66.120	Regulations for Planning and Installation of Irrigation Systems.
15.66.130	Guidelines for Controlling Erosion.
15.66.140	Instructions for Submitting Landscape Plans.
15.66.150	Failure to Comply.
15.66.160	Removal of the Flow Restrictor.
15.66.170	Appeal Process.
15.66.180	Permit Fees.
15.66.190	Deposit of Penalty Monies.
15.66.200	Severability.

**Section 15.66.010 Purpose.** The purpose of this chapter is to set forth and require all new, retrofitted, or modified landscaping to adhere to landscaping practices guided by the latest low water use technology that emphasizes water-use efficiency to maximize the benefit of existing water supplies for the citizens of, visitors to, and the economic well-being of the Big Bear Valley. These measures will significantly reduce wasteful and inefficient consumption of water, and thus make these water resources available for human consumption, sanitation, and fire protection.

**Section 15.66.020 Application; Exception.** The provisions of this chapter shall apply to all customers of the Department, including customers who may also take ground water from private wells not owned or operated by the Department. Some or all of the guidelines and prohibitions contained in this chapter may not apply to specific, publicly owned properties such as schools and parks, which will be evaluated on a case-by-case basis.

**Section 15.66.030 Goals and Objectives.** Due to the increasing demand for water by Department customers for landscaping, and the finite nature of the Big Bear Valley's water resources, the general welfare of the community is best served by using the available water supply efficiently for maximum beneficial uses. Wasteful, inefficient, and unreasonable uses of water must be prevented.

Therefore, the Department hereby declares and establishes the following goals and objectives pertaining to the use of water provided by Department for landscaping.

**A. Goals.**

1. Efficient use and distribution of water used for landscaping and irrigation.
2. Conservation of limited water resources.
3. Use of appropriate planning to eliminate all wasteful and inefficient uses of water from all landscape plans during the planning stage.
4. Provide reasonable and appropriate size and water-use limitations for all landscape features.

**B. Objectives.**

1. To conserve the available water supply.
2. To achieve an overall, per capita reduction in water use.
3. To eliminate inefficient irrigation.
4. To reduce the volume of water waste.
5. To ensure an adequate supply of water to meet the reasonable needs of all users of Department water.
6. To increase the use and installation of water-conserving plants, landscapes, mountainscapes, and Xeriscapes.
7. To require all new developments and encourage existing developments to install low water-use landscape elements and erosion control devices.

**Section 15.66.040 Definitions.** The following words and phrases, whenever used in this chapter, shall be construed as defined in this section, unless otherwise specified within individual sections of this chapter.

"Aquifer" means a permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients.

"Board" means the Department's Board of Commissioners.

"CCF" means 100 cubic feet which equals 748 gallons.

"Customer" (City and County) means all persons, residences, businesses, and entities who receive and/or use water provided by the Department within the City or County.

"Department" means the City of Big Bear Lake Department of Water and Power.

"Drought" means a series of years where precipitation is below average.

"Emitter" means any irrigation nozzle that is used to distribute water to landscape vegetation.

"Environmental sensing device" means any device that uses or recognizes weather or soil moisture to modify irrigation schedules. Typical examples of an environmental sensing device include evapotranspiration irrigation controllers, soil moisture sensors, and rainfall shut-off devices.

"Erosion" means the process of moving soil by any agent of weather, typically the result of rainfall runoff.

"Erosion control" means anything that inhibits erosion.

"Essential water use" means water necessary for human consumption, sanitation, and fire protection. All other use of water, not specifically required to meet these needs, shall be considered nonessential.

"Existing developments" means any development for which certificates of occupancy have been granted.

"Finite" means limited in quantity.

"Fire protection" means water needed to protect humans and their property from an active fire.

"Ground water" means any water derived from springs or wells.

"Hardscape" means a landscape feature that contains no vegetation. Examples of a Hardscape include walkways, decks, graveled areas, and areas covered with mulches.

"His" is a collective term independent of gender and may refer to male or female.

"Human consumption" means water directly consumed by humans and their pets or livestock.

"Inefficient" means using water in a quantity in excess of the amount required, as determined by the Department, to accomplish a given task.

"Inefficient irrigation" means the process of providing more water to landscape plants or elements than is required for healthy, normal growth and appearance.

"Irrigation" means the process of providing supplemental water supplied by the Department to landscape plants and elements.

"Landscape" means the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, hardscapes, and other non-porous areas.

"Landscape element" means any and all unique features of a landscape.

"Landscaping" means the process of adding or subtracting vegetation or non-vegetative materials or their support structures (e.g. irrigation systems, walkways, retaining walls) to a landscape.

"Maximize the benefit" means to obtain the greatest feasible benefit.

"Mountainscape" means any low water-use landscape that is compatible with the climate of the Big Bear Valley.

"New developments" means developments that are under construction or will be constructed in the near future, and for which certificates of occupancy have not been granted.

"Percolation" means movement of water, by the forces of gravity, through soils and bedrock to a point of greater depth than its previous location.

"Perennial yield" means the maximum quantity of water available on an annual basis for the foreseeable future. This quantity depends on the amount of water economically, legally, and politically available to the organization(s) managing the ground water basin.

"Rain shut-off sensor" means any mechanism that detects precipitation and transmits the information to an irrigation controller.

"Recharge" means the process of adding water to an aquifer.

"Retrofit" means any change to any existing element.

"Sanitation" means cleanliness or the disposal of unhealthful waste.

"Turf" means a surface layer of earth containing grass with its roots.

"Wasteful" means using water in a quantity in excess of the amount needed to accomplish a given task.

"Water conservation plan" means a plan developed for any property that provides recommendations for conserving water based on how the home or business occupying the property used water in the past.

"Water conservation" means practices or activities which result in the use of water efficiently and in quantities considered less than average.

"Water features" means any landscape feature that utilizes standing or moving water as a main component. Standard examples are ponds, streams, and fountains.

"Water loss" means the loss of water caused by evaporation.

"Water resources" means the retrievable and usable supply of water.

"Water usage" means the act of using water provided by the Department's water system.

"Water-use efficiency" means the use of water in a way that minimizes waste (i.e. use beyond which is needed to accomplish a task).

"Winterize" means turning off water service and draining the on-site pipes or plumbing to prevent damage to the system during the winter months due to freezing.

"Xeriscape" means a landscape that requires relatively little water to install and maintain. Qualifying landscapes include those that range from highly vegetated to completely lacking in vegetation.

**Section 15.66.050 Water-Use Policies and Requirements.**

- A. Customers shall be encouraged to use native and water-conserving plants for landscaping.
- B. Customers shall be required to minimize the use of turf at all new and retrofitted commercial and residential landscapes.
- C. Water conservation, emphasizing water use efficiency, will be required as set forth herein.
- D. The Department shall require and promote development of water conservation plans for all customers whose water use exceeds reasonable guidelines developed by the Department.
- E. The Department shall require repair of all leaks, once they are detected.
- F. All outdoor irrigation systems shall be shut off and winterized between November 1<sup>st</sup> and April 1<sup>st</sup> annually.
- G. The Department will establish reasonable water use and irrigation standards for all residential and commercial customers in its service area.

**Section 15.66.060 Nonessential water use.** Nonessential water use means water use in violation of Big Bear Lake Municipal Code section 17.11.040. The list of prohibited acts contained in section 17.11.040 is not exhaustive and may include other actions not listed therein.

**Section 15.66.070 Turf installation.**

- A. Turf installations shall not exceed 500 square feet in size for each property.

- B. All new and retrofitted landscapes with turf must be irrigated using a sprinkler system with an automatic irrigation controller, that incorporates evapotranspiration and rain shut-off features and has the capability to accommodate all time and date irrigation restrictions employed by the Department.
- C. Prior to installing turf, the soil must be prepared to a minimum depth of six (6) inches by adding topsoil and soil conditioners to enhance the water retention capability of the soil.
- D. The design of the turf area must be developed to allow efficient irrigation and prevent overspray and runoff.
- E. A master valve must be installed on all new or retrofitted landscapes containing turf.

**Section 15.66.080 Water Feature Installation.**

- A. Water feature installations shall not exceed an aggregate of 500 square feet of total surface area of customer's property.
- B. When a water feature moves water, such a water feature must utilize a recirculating pump.

**Section 15.66.090 Landscape Plans and Permits.**

- A. New Installations. Landscape plans must be submitted for review and permitting by a Department representative whenever the proposed landscape exceeds 1,000 square feet or when any turf is proposed to be installed. The landscape plan review and approval process will have no impact in granting a certificate of occupancy.
- B. Retrofitting or Altering Existing Landscape. Landscape plans must be submitted for review and permitting by a Department representative whenever the combination of existing landscape and the proposed additional or retrofitted landscape exceeds 1,000 square feet.
- C. Plan Review and Permitting. All landscape plans must be submitted to the Department for review and approval at least ten (10) days prior to the start of installation. A landscaping permit will be issued upon approval of the landscape plan.

**Section 15.66.100 New Landscape Regulations.**

- A. Turf installations shall not exceed 500 square feet in size for each property.
- B. Landscape plants must be grouped by similar irrigation requirements, and irrigation systems must be set up to irrigate individual water-use zones in accordance with their individual needs.

- C. All slope and soil conditions, that may cause excessive runoff, must be identified and clearly resolved during the planning and installation process.
- D. Landscape elements must be appropriately maintained to maximize water-use efficiency.
  - 1. All sprinkler, emitter, pipe and pond leaks must be repaired timely, and all irrigation systems must be tested and inspected before regular use each spring.
  - 2. All irrigation systems must be shut off and winterized between November 1<sup>st</sup> and April 1<sup>st</sup> annually.

**Section 15.66.110 Regulations for Retrofitting Landscapes.**

- A. On landscapes that do not contain existing turf, new turf must be installed in accordance with section 15.66.070.
- B. If total turf area of a landscape exceeds 500 square feet, a property owner or customer is prohibited from expanding his turf area. If total turf area of a landscape is less than 500 square feet, a property owner or customer may expand his turf area provided that the total turf area does not exceed 500 square feet.
- C. If a landscape contains more than 700 square feet of turf, turf may be rearranged as long as the net area of turf is reduced by at least twenty-five percent (25%).
- D. Existing irrigation systems may be used as long as they can be employed to maximize irrigation efficiency on the retrofitted landscape. If existing irrigation systems cannot maximize irrigation efficiency, a new irrigation system must be installed.
- E. Landscape plants must be grouped by similar irrigation requirements, and irrigation systems must be set up to irrigate individual water-use zones in accordance with their individual needs.
- F. All slope and soil problems that may cause excessive runoff must be identified and clearly resolved during the planning and retrofitting process.
- G. Landscape elements must be appropriately maintained to maximize water-use efficiency.
  - 1. All sprinkler, emitter, pipe and pond leaks must be repaired timely, and all irrigation systems must be tested and inspected before regular use each spring.
  - 2. All irrigation systems must be shut off and winterized between November 1<sup>st</sup> and April 1<sup>st</sup> annually.

**15.66.120 Regulations for Planning and Installation of Irrigation Systems**

- A. Automatic irrigation control systems, that have the ability to accommodate all time and date irrigation restrictions employed by the Department, are required on all landscapes greater than 1,000 square feet in size.
- B. Sprinklers will only be allowed on turf and other groundcovers. All other landscape plantings must be irrigated with efficient, low water-use devices, such as, drip systems or bubblers.
- C. Sprinklers shall not be used on planter strips less than ten (10) feet wide, unless it can be demonstrated to the satisfaction of the Department that irrigation equipment will provide efficient irrigation and prevent overspray.
- D. All irrigation controllers must be equipped with rain shut-off sensors.
- E. A master valve must be installed on all new or retrofitted landscapes containing turf.

**15.66.130 Guidelines for Controlling Erosion**

- A. All landscape plans for new and retrofitted landscapes must identify potential erosion problems.
- B. Preventing erosion.
  - 1. All slopes and areas of bare soil must be evaluated for their erosion potential.
  - 2. All areas that are susceptible to erosion must be addressed with an erosion prevention plan as required by the Department.
  - 3. Areas that contain running water from adjoining properties during rain showers or snow melt must be prepared to minimize erosion caused by this type of runoff utilizing dry stream beds, erosion resistant vegetation, or other methods required by the Department.

**15.66.140 Instructions for Submitting Landscape Plans.** Landscape plans shall be submitted with the permit application required by this chapter and shall contain the following information:

- A. If a new or retrofitted landscape exceeds 3,000 square feet, the property owner or customer shall submit the following to the Department:
  - 1. Appropriate addresses and contact information for the property owner and landscape contractor.
  - 2. The proposed landscape design.

3. The existing landscape design, if the landscape is being retrofitted.
  4. Identification of low, medium, and high water-use vegetation zones.
  5. Plant lists associated with each water-use vegetation zone.
  6. The proposed irrigation system design, including the location, type, size and description of landscaping to be installed (including all trees, shrubs, groundcover and turf /grass areas).
  7. The existing irrigation system design, if the landscape is being retrofitted, including the location, type, approximate size, and description of landscaping (including all trees, shrubs, groundcover and turf /grass areas).
  8. Identification of areas with slope or soil problems that need special irrigation features to effectively irrigate these areas.
  9. A detailed description of solutions to irrigation problems identified in section 15.66.150(a)(8).
  10. Identification and description of erosion control features.
  11. Proposed irrigation schedules for all landscape features.
  12. A list of environmental sensing devices associated with irrigation controllers, such as, evapotranspiration controllers, soil moisture sensors, and rainfall shut-off devices.
  13. A detailed description of all water features.
  14. An estimate of water use per month (in ccfs) for all landscape features, including water loss associated with water features.
  15. A maintenance schedule for all landscape features.
  16. A north arrow and scale.
  17. Clearly legible and identifiable property lines and their dimensions.
  18. The date of submittal of the plans and any revision dates.
  19. A written narrative highlighting water-conserving features of the proposed landscape and its adherence to Xeriscape principles.
- B. If the new or retrofitted landscape is less than 3,000 square feet and greater than 1,000 square feet, the property owner or customer shall submit the following to the Department:

1. Appropriate addresses and contact information for the property owner or customer and landscape contractor.
2. The proposed landscape design including the location, type, approximate size, and description of landscaping (including all trees, shrubs, groundcover and turf/grass areas).
3. If a landscape is being retrofitted, a written summary of the proposed changes and a list of the water-conserving features of the new landscape is required.
4. An estimate of water use per month (in ccfs) for all landscape features, including water loss associated with water features.
5. All landscape plans shall clearly show xeriscape principles are being implemented.

**15.66.150 Failure to Comply.** The penalties for failure to comply with any provisions of this chapter shall be as follows:

- A. First violation. The Department will contact the customer by certified mail explaining the violation, the need for the regulation that was violated, a list of penalties associated with continued violation, and request voluntary compliance.
- B. Second violation. The Department will contact the customer by certified mail explaining the violation, the need for the regulation that was violated, inform the customer of his previous violations, provide a list of penalties associated with continued violation, and add a surcharge to the customer's water bill which is twice the customer's charge for water usage for the billing cycle during which the violation occurred. If the customer does not cure the violation within 10 days of the date of the notification letter from the Department, the Department will deem the failure to cure as a new violation.
- C. Third violation. The Department will contact the customer by certified mail explaining the violation, the need for the regulation that was violated, inform the customer of his previous violations, provide a list of penalties associated with continued violation, add a surcharge to the customer's water bill which is triple the customer's charge for water usage for the billing cycle during which the violation occurred, and notify the Board. If the customer does not cure the violation within 10 days of the date of the notification letter from the Department, the Department will deem the failure to cure as a new violation.
- D. Fourth violation. The Department will contact the customer by certified mail explaining the violation, the need for the regulation that was violated, inform the customer of his previous violations, provide a list of penalties associated with continued violation, install a flow restrictor in the customer's water service, add

a surcharge to the customer's bill which is quadruple the customer's charge for water usage for the billing cycle during which the violation occurred, together with all associated expenses dealing with the flow restrictor, and notify the Board. If the customer does not cure the violation within 10 days of the date of the notification letter from the Department, the Department will deem the failure to cure as a new violation.

- E. Fifth violation. The Department will contact the violator by certified mail explaining the violation, the need for the regulation that was violated, inform the customer of his previous violations, and, upon approval of the Board, discontinue water service to the customer until the customer delivers a notarized written agreement to abide by all water use regulations established by Department and such other requirements as the Board may determine to be appropriate under the circumstances.

**15.66.160 Removal of the Flow Restrictor.** The water restrictor will be removed, or water service will be restored, whichever the case may be, upon a hearing as provided in Section 15.66.180 where the customer demonstrates to the satisfaction of the General Manager that the cause of the violation has been corrected and all fees and surcharges have been paid.

**15.66.170 Appeal Process.** A customer shall have the right to a hearing before the General Manager if the Department receives a written request for such a hearing on or before twenty-one (21) days after the date the notice is mailed to the customer.

The written request for a hearing shall include a statement setting forth reasons why the customer believes that a violation of this chapter has not occurred, along with any documentation that may substantiate the customer's position.

The customer's written request for a hearing shall include payment of the surcharge. Said payment shall be held on deposit with the Department. If, following the hearing, it is determined the surcharge will not be imposed, the Department will refund said deposit.

Upon receipt of a request for a hearing, the General Manager shall contact the customer regarding proposed dates for the hearing. The hearing shall be conducted at the Department's offices. The date of the hearing shall be set at a time that is mutually convenient to both parties, but in any event, shall be held no later than fifteen (15) days from the date of customer's request.

The hearing shall be informal and shall not require adherence to any particular procedure. The General Manager shall render a written decision on or before five (5) days following the date of the hearing.

The customer shall only have a right to appeal alleged violations of the procedures of this chapter by the General Manager or his staff to the Board if the Board receives a written request for such an appeal hearing on or before fifteen (15) days after the date of the General Manager's decision. For all other matters or issues, the decision of the General Manager is a final decision of the Department, and the applicant shall have no right of appeal.

The hearing before the Board shall be held at a regular Board meeting within thirty (30) days of the Department receiving the written request for a hearing. The decision of the Board shall be final.

**15.66.180 Permit Fees.** No fee shall be charged for the filing of an application or landscape plan under this chapter.

**15.66.190 Deposit of Penalty Monies.** All monies collected by the Department, pursuant to any of the surcharge provisions of this chapter, shall be deposited in the Water Revenue Fund as reimbursement for the Department's costs and expenses of administering and enforcing this chapter and its general Water Conservation Program.

**15.66.200 Severability.** If any provision of these Regulations is found to be illegal, unconstitutional, or unenforceable for any reason whatsoever, that provision shall be severed from the remaining provisions, which shall remain in full force and effect.

**SECTION 2.** This Ordinance shall take effect and shall be published in accordance with applicable law.

PASSED, APPROVED AND ADOPTED this 14th day of March, 2005.

AYES:	Conklin, Dally, Harris, Jahn, Mulvihill
NOES:	None
ABSENT:	None
ABSTAIN:	None

March 14, 2005

Date

Darrell Mulvihill  
Darrell Mulvihill, Mayor

ATTEST:

Katherine E. Jefferies  
Katherine E. Jefferies  
City Clerk

REVIEWED AND APPROVED:

Stephen P. Bertosh  
Best Best & Krieger LLP  
City Attorney

Page 14

Ordinance No. 2005-348

STATE OF CALIFORNIA            )  
COUNTY OF SAN BERNARDINO ) ss  
CITY OF BIG BEAR LAKE        )

I, Katherine E. Jefferies, City Clerk of the City of Big Bear Lake do hereby certify that the whole number of members of the City Council of said City is five; that the foregoing ordinance, being Ordinance No. 2005-348 is a full, true and correct original of Ordinance No. 2005-348 of the said City of Big Bear Lake, California, entitled:

AN ORDINANCE OF THE CITY OF BIG BEAR LAKE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AMENDING CHAPTER 15.66 OF ARTICLE XV OF THE BIG BEAR LAKE MUNICIPAL CODE DEALING WITH THE REGULATION OF LANDSCAPING

was duly passed and adopted by the said City Council, approved and signed by the Mayor of said City, and attested by the City Clerk of said City, all at a regular meeting of the said Council on the 14<sup>th</sup> day of March 2005, and that the same was so passed and adopted by the following vote:

AYES:           Conklin, Dally, Harris, Jahn, Mulvihill  
NOES:           None  
ABSENT:       None  
ABSTAIN:       None

I do hereby further certify that pursuant to the provisions of Section 36933 of the Government Code of the State of California, that the foregoing Ordinance No. 2005-348 was duly and regularly published according to law and the order of the City Council and circulated within said City.

Katherine E. Jefferies  
Katherine E. Jefferies, CMC  
City Clerk

**RESOLUTION NO. DWP 2008-05**

**A REVISED RESOLUTION OF THE BOARD OF COMMISSIONERS  
OF THE DEPARTMENT OF WATER AND POWER  
OF THE CITY OF BIG BEAR LAKE,  
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA,  
ADOPTING FAILURE TO COMPLY PROCEDURES FOR VIOLATIONS OF ITS  
RULES AND REGULATIONS**

WHEREAS, the Department of Water and Power (Department) has instituted a number of rules and regulations which are necessary for the preservation of the Department's existing water supply, and

WHEREAS, the Department desires to impose a uniform set of failure to comply procedures for the purposes of ensuring compliance with these rules and regulations, and

WHEREAS, the Department feels that the termination of service is the most appropriate manner to deal with any failures of compliance, and

WHEREAS, the Department's Board of Commissioners wishes to adopt a new resolution to replace Resolution No. 2006-13, incorporating the desired revisions and restating those provisions which are not revised.

NOW, THEREFORE, BE IT RESOLVED that the Board of Commissioners of the Department of Water and Power, City of Big Bear Lake, does hereby adopt this Resolution as follows:

**Section 1. Notice of Violation.**

The Department may not terminate service (the shutoff and locking of a customer's meter) due to a customer's failure to comply with the Department's rules and regulations unless the Department first gives notice of the violation and the impending consequence of the violation. Every failure to comply notice shall include all of the following information: (i) the name and address of the customer whose account is in violation of the Department's rules and regulations, (ii) the specific nature of the violation, (iii) the deadline by which the customer must comply with the Department's rules and regulations, (iv) the consequences of failing to comply with the Department's rules and regulations; and (v) the telephone number of a Department representative who can provide additional information regarding the notice. When a notice of violation has been sent to an owner of a property that has multi-tenants, the Department shall endeavor to provide notice to each unit whether residential or commercial.

**Section 2. Correction of Violation; Procedures and Enforcement.**

A. Within fourteen (14) calendar days of the date of the failure to comply notice, the customer must correct the violation or contact the Department staff regarding correction of the

violation. If the customer fails to correct the violation or contact the Department staff regarding correction of the violation, the Department shall move forward with terminating service as set forth in Section 4 herein.

B. After contacting Department staff, if Department staff determines that the customer is unable to comply with the Department's rules and regulations within the time period prescribed by the Department but is willing to comply and has made reasonable progress towards compliance, then the Department may grant an extension for compliance, not exceeding twelve (12) months. If, however, the customer has not made reasonable progress to comply with said rules and regulations, the Department will proceed to terminate service unless, the customer appeals that decision to the Board of Commissioners in accordance with Section 3 herein. The customer's failure to appeal, in the case where the customer is not making reasonable progress to comply with said rules and regulations, shall result in the termination of service as set forth in Section 4 herein.

### **Section 3. Appeal Process.**

A. A customer shall have the right to a hearing before the Board of Commissioners, if the Department receives a written request for such a hearing on or before five (5) business days after the Department staff renders a decision under this Resolution that the customer finds objectionable. The written request for a hearing shall include a statement setting forth the reasons why the customer disagrees with the decision of Department staff. Documentation that substantiates the applicant's position must be submitted with the request for a hearing.

B. Upon request for a hearing, the General Manager shall contact the customer regarding the proposed date for the hearing. The hearing shall be conducted at the next regularly scheduled Board meeting for which the hearing can be placed on the agenda.

C. If the Board does not render a decision at the hearing, the Board shall render a written decision on or before five (5) business days following the date of the hearing. The decision of the Board shall be final.

D. Upon completion of the appeal process, and a determination that the customer has failed to comply with the Department's rules and regulations, the Department may move forward with the termination of service as set forth in Section 4 herein.

### **Section 4. Termination of Service.**

A. Subject to the notice requirements of Subsection "B" herein, the Department will terminate service for failure to comply with the Department's rules and regulations.

B. The Department shall make a reasonable attempt to contact an adult person residing at the address where the violation occurred either by telephone or personal contact, at least twenty-four (24) hours prior to the termination of service, except that, whenever telephone or personal contact cannot be accomplished, the Department shall give, by mail, in person, or by

posting in a conspicuous location at the premises, a notice regarding the termination of service, at least forty-eight (48) hours in advance.

C. The Department shall only terminate service at the property where the violation occurred, and not at another property in which the customer has an interest.

D. If the customer later corrects the violation or is granted an extension by the Department, the customer may qualify for reinstatement of service, as applicable.

E. The customer shall be billed for the reasonable cost of terminating and reinstating service as a result of the customer's violation of the Department's rules and regulations. The Department shall not reinstate regular service until such costs are paid in full to the Department.

#### **Section 5. Termination of Service Prohibited.**

The Department shall not terminate service in any of the following situations:

A. During a pending Department investigation of a customer dispute or complaint.

B. When the customer has been granted an extension for compliance with the Department's rules and regulations.

C. When a public health or building officer certifies that the termination of service would result in a significant threat to the health or safety of the residential occupants or the public.

D. Upon certification of a licensed physician that to do so will be life threatening to the residential customer and the customer is financially unable to comply with the Department's rules and regulations within the time period prescribed by the Department and is willing to comply with said rules and regulations provided the Department grants an extension for compliance, not exceeding twelve (12) months.

#### **Section 6. Severability.**

If any provision of this resolution is found to be illegal, unconstitutional, or unenforceable for any reason whatsoever, that provision shall be severed from the remaining provisions of this Resolution, which shall remain in full force and effect.

#### **Section 7. Repeal of Resolution No. 2006-13**

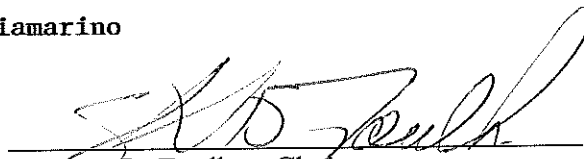
This Resolution shall replace Resolution No. 2006-13, which is hereby repealed.

PASSED, APPROVED, AND ADOPTED this 27<sup>th</sup> day of May 2008.


AYES: Foulkes, Willey, Tarras

NOES: None  
ABSTAIN: None  
ABSENT: Miller, Giamarino

DATE: 5/27/08

  
Stephen D. Foulkes, Chair  
DWP Board of Commissioners

ATTEST:

  
Robyn Bratton  
Secretary to the Board

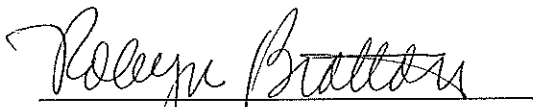
**Resolution No. DWP 2008-05**  
**Failure to Comply**  
May 27, 2008

**CERTIFICATION**

STATE OF CALIFORNIA                    )  
COUNTY OF SAN BERNARDINO)  
CITY OF BIG BEAR LAKE                )

I, Robyn Bratton, Secretary to the Board of Commissioners of the Department of Water & Power of the City of Big Bear Lake, California, does hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2008-05, was duly passed and adopted by the said Board and attested to by the Secretary of said Board, all at a Regular meeting of the said Board held on the 27th day of May 2008.

AYES:       Foulkes, Willey, Tarras  
NOES:       None  
ABSTAIN: None  
ABSENT:   Miller, Giamarino

  
\_\_\_\_\_  
Robyn Bratton  
Secretary to the Board

(SEAL)

**RESOLUTION NO. DWP 2007-03**

**A RESOLUTION OF THE BOARD OF COMMISSIONERS  
OF THE DEPARTMENT OF WATER & POWER  
OF THE CITY OF BIG BEAR LAKE,  
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA  
ADOPTION OF REGULATIONS FOR NON-WATER SHORTAGE  
EMERGENCIES IN THE DEPARTMENT OF WATER AND POWER'S  
SERVICE AREA**

**RESCINDING AND SUPERSEDING ARTICLE NER OF  
RESOLUTION NO. DWP 2006-11, ADOPTED JULY 25, 2006**

WHEREAS, the Department of Water & Power, City of Big Bear Lake ("DWP") has the duty to supply existing customers with water; including, most importantly, water for Human Consumption, Sanitation, and Fire Protection, and

WHEREAS, the water resources of the DWP, which consist entirely of ground water, are limited, and

WHEREAS, emergencies, other than water shortage emergencies, occasionally occur within the Big Bear Valley, which may affect the DWP's ability to serve its customers, and

WHEREAS, on July 25, 2006, the DWP Board adopted Resolution No.

DWP 2006-11 amending general water use guidelines, rules, and regulations for Non-Water Shortage Emergencies and Water Shortage Emergencies, which were established in previous DWP Resolutions, and

WHEREAS, the DWP Board of Commissioners desires to update its guidelines, rules, and regulations for Non-Water Shortage Emergencies for the purposes of better conserving water resources during such emergencies.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the DWP, City of Big Bear Lake, as follows:

Article NER of Resolution No. DWP 2006-11 is hereby rescinded and replaced by Resolution No. DWP 2007-03.

## **ARTICLE NER: NON-WATER SHORTAGE EMERGENCIES**

### **Section NER 1. Definitions.**

The following words and phrases, whenever used in this article, shall be construed as defined in this section, unless otherwise specified within individual sections of this article.

DWP Water System. The DWP Water System is composed of five independent systems, four within the Big Bear Valley (Erwin Lake, Fawnskin, Moonridge/Big Bear Lake, and Lake William) and one in Rimforest.

Fire Protection. Water needed to protect humans and their property from an active fire.

Human Consumption. Water directly consumed by humans, their pets, and livestock.

Non-water Shortage Emergencies. Any emergency that has the potential to adversely affect the DWP's water system, water supply, or water service, which is caused by emergencies other than water shortage emergencies.

Sanitation. Cleanliness or the disposal of unhealthful waste.

### **Section NER 2. Emergency Resolution.**

- A. Non-water Shortage Emergencies (such as wildfires, earthquakes, and emergencies other than water shortage emergencies) can be declared and emergency regulations can be enacted by the Board or the General Manager as specified in Section NER 2.B.
- B. Emergencies can be declared and emergency regulations can be adopted by a majority vote of the DWP Board unless such a vote cannot be obtained or emergency conditions require immediate action. Under these conditions, the General Manager of the DWP, or his authorized representative, shall be authorized to declare Non-water Shortage Emergencies and implement all appropriate measures deemed necessary under the circumstances.

### **Section NER 3. Purpose.**

The purpose of this article is to provide rules and regulations for the DWP and its customers to follow when emergencies, other than water shortage emergencies, are declared.

#### **Section NER 4. Application.**

This article applies to all emergencies that have a potential to cause a disruption in water service to all or part of the DWP service area, with the exception of water shortage emergencies. Water shortage emergencies will be specifically addressed in the Water Shortage Emergency Resolution No. DWP 2007-02, or any amendments thereto. All regulations within this Resolution apply to all DWP customers. In situations where a property is serviced by both a DWP service and a private well, no DWP water may be used for activities that are prohibited by any rules or regulations set forth in this Resolution. The DWP Water System is composed of five separate water systems. Each water system within the DWP service area will be evaluated independently, and the need for emergency conditions to be declared will be determined on a case-by-case basis.

#### **Section NER 5. Policy.**

- A. When an emergency is declared as set forth herein, water service may be interrupted without notice. The DWP shall not have any responsibility for any damage arising out of such interruption of service.
- B. All inappropriate uses of water discovered during the emergency conditions covered by this Resolution will result in the immediate lock off of the water service at the DWP meter. Inappropriate water use, during these emergency conditions, include any use other than water necessary for Human Consumption, Sanitation, and Fire Protection. All outdoor water use will be suspended until further notice. Interruptions of service may occur while the DWP is assessing whether a customer is utilizing DWP water in violation of this resolution.
- C. All decisions associated with this Resolution will be determined by the Board of Commissioners, when possible, the General Manager, or his authorized representative. All declared emergencies will be dealt with in the following three phases:
  - 1. The Assessment Phase
  - 2. The Emergency Phase
  - 3. The Recovery Phase
- D. The Assessment Phase shall commence upon the declaration of an emergency at the inception of an event (e.g. an earthquake) or when an event is imminent (e.g. wildfire). Upon the declaration of an emergency, the following procedures shall be followed:

1. DWP staff will assess the emergency and its potential effects on the DWP's ability to provide water for Human Consumption, Sanitation, and Fire Protection. This assessment should be completed within forty-eight (48) hours or less from the declaration of the emergency. Under exceptional circumstances or changing conditions, the assessment may require additional time to complete. Nonetheless, assessment of the situation shall be completed as quickly and efficiently as possible under the prevailing conditions.
  2. Use of water outdoors for other than emergency purposes shall be prohibited.
  3. Use of water indoors for purposes other than Human Consumption, Sanitation, and Fire Protection shall be prohibited.
  4. All water use shall be minimized.
- E. Upon completion of the Assessment Phase, the Emergency Phase shall begin and continue as long as emergency conditions persist. For the duration of the Emergency Phase, the following procedures shall be followed:
1. Use of water outdoors for other than emergency purposes is prohibited.
  2. Use of water indoors for purposes other than Human Consumption, Sanitation, and Fire Protection is prohibited.
  3. All water use shall be minimized.
- F. When emergency conditions end, the Board, when possible, the General Manager, or his representative shall declare an end to the Emergency Phase, which will signal the beginning of the Recovery Phase. The Recovery Phase shall last until normal conditions return to the DWP service area. For the duration of the Recovery Phase, the following procedures shall be followed:
1. Use of water outdoors for other than emergency purposes shall be prohibited, unless the General Manager determines that restricted outdoor water use is reasonable given the current state of the DWP's water supply and system. When restricted outdoor use is permissible, the public will be provided with a specific list of approved outdoor water uses.
  2. Use of water indoors for purposes other than Human Consumption, Sanitation, and Fire Protection shall be prohibited. When indoor water use in excess of these essential uses is permissible, the public will be provided with a specific list of approved indoor water uses.

3. All water use shall be minimized.

- G. When recovery is complete, water use guidelines shall return to the regulations that were in effect immediately prior to the declaration of the emergency, unless otherwise specified.

For ease of reference, a summary of the actions associated with the three phases described in this article is set forth in the following table:

Table NER 1. Summary of the guidelines associated with Non-water Shortage Emergencies.

<b>Assessment Phase</b>	<b>Emergency Phase</b>	<b>Recovery Phase</b>
The first 48 hours after the recognition of the emergency. DWP staff evaluates the current problem and its effect on the water system.	The duration of emergency conditions.	The length of time needed to return to normal conditions.
No outside water use other than Fire Protection.	No outside water use other than Fire Protection.	No outside water use other than Fire Protection, unless specific direction is provided to the community by the General Manager.
Indoor water use for Human Consumption, Sanitation, and Fire Protection only.	Indoor water use for Human Consumption, Sanitation, and Fire Protection only.	Indoor water use for Human Consumption, Sanitation, and Fire Protection only, unless specific direction is provided to the community by the General Manager.
Encourage minimal water use.	Encourage minimal water use.	Encourage minimal water use.

**Section NER 6. Failure to Comply.**

Violations of this resolution or any policies adopted pursuant to this Resolution that require immediate attention will result in an immediate lock off of water services. Violations of this Resolution that do not require immediate attention may result in either the installation of a flow restrictor or the termination of service in the manner set forth in the failure to comply provisions of Resolution No. DWP 2006-13 as now written or as amended from time to time.

**Resolution No. DWP 2007-03**

PASSED, APPROVED, AND ADOPTED THIS 27<sup>th</sup> day of February 2007.

AYES: Conley, Willey, Speyers, Miller

NOES: None

ABSTAIN: None

ABSENT: One Vacant Seat

2/27/07  
Date

Barbara Willey  
Barbara Willey, Chairman  
DWP Board of Commissioners

ATTEST:

Robyn Bratton  
Robyn Bratton  
Secretary to the Board


**Resolution No. DWP 2007-03**

**CERTIFICATION**

STATE OF CALIFORNIA            )  
COUNTY OF SAN BERNARDINO )  
CITY OF BIG BEAR LAKE        )

I, Robyn Bratton, Secretary to the Board of Commissioners of the Department of Water & Power of the City of Big Bear Lake, California, do hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2007-03, was duly passed and adopted by said Board, and attested to by the Secretary of said Board, all at a Regular meeting of said Board, held on the 27<sup>th</sup> day of February 2007, that the same was so passed and adopted by the following vote:

AYES:       **Gonley, Willey, Speyers, Miller**  
NOES:       **None**  
ABSTAIN:   **None**  
ABSENT:    **One Vacant Seat**

  
\_\_\_\_\_  
Robyn Bratton  
Secretary to the Board

(SEAL)

**RESOLUTION NO. DWP 2007-02**

**A RESOLUTION OF THE BOARD OF COMMISSIONERS  
OF THE DEPARTMENT OF WATER & POWER  
OF THE CITY OF BIG BEAR LAKE,  
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA  
ADOPTION OF REGULATIONS FOR WATER SHORTAGE EMERGENCIES  
IN THE BIG BEAR VALLEY**

**RESCINDING AND SUPERSEDING ARTICLES WCR AND WSR OF  
RESOLUTION NO. DWP 2006-11, ADOPTED JULY 25, 2006**

WHEREAS, the Department of Water and Power, City of Big Bear Lake ("DWP") has the duty to supply existing Customers with water; including, most importantly, water for human consumption, sanitation, and fire protection, and

WHEREAS, the water resources of the DWP, which consist entirely of ground water, are limited, and

WHEREAS, the ground water basins within the DWP's service area are only recharged from rain and snow and the resulting percolation, and

WHEREAS, Big Bear Valley exists in a climate where periodic droughts will continue to occur and aquifer recharge can be minimal for several consecutive years, and

WHEREAS, the estimate of perennial yield of the aquifers, water usage by customers, and anticipated growth of the community indicate that water demand may exceed supply in the foreseeable future; and

WHEREAS, the DWP has the power and the authority to adopt and enforce water conservation measures within its service area pursuant to Water Code sections 350 et seq. and 375 et seq.; and

WHEREAS, on December 17, 2002, the Board of Commissioners adopted Resolution No. DWP 2002-07 which declared the existence of a water shortage emergency in accordance with Water Code sections 350 et seq., and directed the DWP staff to develop specific recommendations for restrictions on the delivery and consumption of water within the DWP's service area in order to address the water shortage in the DWP's service area; and

WHEREAS, on July 25, 2006, the DWP Board of Commissioners adopted Resolution No. DWP 2006-11 amending guidelines, rules and regulations for Non-water Shortage Emergencies and water shortage emergencies, which were established in previous DWP Resolutions, and

WHEREAS, on account of the continued pressures on the DWP's water supply and the uncertainty surrounding ground water Recharge, a water shortage emergency, within the meaning of Water Code section 350, continues to exist; and

WHEREAS, the DWP Board of Commissioners desires to update its guidelines, rules, and regulations governing water usage during water shortage emergencies by rescinding Resolution No. 2006-11, and adopting a resolution that better serves to address this current water shortage emergency.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the DWP, City of Big Bear Lake, as follows:

Section 3 of Resolution No. DWP 2003-05 and Articles WCR and WSER of Resolution No. DWP 2006-11 are hereby rescinded, and Article WSER of Resolution No. DWP 2006-11 is replaced by Resolution No. DWP 2007-02.

**Section WSER 1. Purpose.**

The purpose of this Resolution is to provide rules and regulations governing water usage in order to minimize the effect of a shortage of water supplies on DWP Customers during the water shortage emergency. This Resolution is adopted pursuant to Water Code sections 350 et seq., which authorizes the adoption of regulations and restrictions on the delivery and consumption of water during water shortage emergencies.

**Section WSER 2. Application.**

The provisions of this Resolution shall apply to all persons, customers, and property served by the DWP, wherever situated, and for all types of water being provided by the District. In situations where a property is serviced by both the DWP and a private well, no DWP water may be used for activities that are prohibited by any regulation set forth in this Resolution.

**Section WSER 3. Administration.**

- A. The General Manager, of the DWP, or his designated representatives, shall be responsible for enforcement of the provisions of the resolution.
- B. The General Manager, or his designated representatives, shall likewise be authorized to grant administrative relief from any provision of this resolution as they deem appropriate under the circumstances.

**Section WSER 4. TECHNICAL REVIEW TEAM ("TRT").**

The Technical Review Team shall review and evaluate the status, condition, and availability of the DWP's ground water supplies and recommend and advise the Board of Commissioners, concerning water levels in service area wells, the system's ability to produce and distribute water to its customers, Conservation Stages, and other water conservation matters, including but not limited to the number of new service connections allowed annually. The TRT shall be comprised of, at a minimum, five individuals derived from the Board of Commissioners and the DWP management staff.

The TRT shall have an additional member who is either a hydrogeologist or engineering consultant. Additional individuals may be added to the TRT when any circumstance arises that requires specialized or additional expertise.

#### **Section WSER 5. Policy.**

The Board of Commissioners, upon reviewing the recommendations of the TRT, shall determine the Conservation Stages, and other water conservation matters, including but not limited to the number of new service connections allowed annually that are appropriate for all or portions of the DWP Water System. In some instances, the Board of Commissioners may act without consulting the TRT. Evaluation of the appropriate Conservation Stage, the number of new service connections, and designated landscape irrigation days will include, but not be limited to the following considerations:

1. Current ground water levels.
2. Recent trends in the ground water levels.
3. The previous winter's precipitation.
4. The previous year's water demand.
5. Current and anticipated demand for water by DWP Customers.
6. Current and anticipated production capacity of the DWP water sources.
7. Damage to one or more of the DWP's water systems.
8. Anticipated ability to optimize use of above-ground water storage.
9. Predicted weather patterns.

#### **Section WSER 6. Definitions.**

The following words and phrases, whenever used in this article, shall be construed as defined in this section, unless otherwise specified within individual sections of this article.

Conservation Stage. The level of mandatory water conservation presently required from Customers as determined by the Board of Commissioners in accordance with the provisions of this Resolution.

Customer. Any person, persons, association, corporation, government agency, or other entity supplied with water service from DWP.

DWP Water System. The DWP Water System is composed of five independent systems, four within the Big Bear Valley (Erwin Lake, Fawnskin, Moonridge/Big Bear Lake, and Lake William) and one in Rimforest.

Landscape. All portions of a property that are not covered by the foundations of buildings or other structures.

Non-water Shortage Emergencies. Any emergency that has the potential to adversely affect the DWP's water system, water supply or water service, which is not directly related to actual or potential water shortages covered by this resolution.

Recharge. The process of adding water to an aquifer.

Turf. Lawn or grass, in all its forms, whether grown from seed or transplanted.

New Turf. Lawn or grass, in all its forms, whether grown from seed or transplanted that has never been irrigated using DWP water.

Water shortage emergency. Any water shortage within the meaning of Water Code sections 350 et seq.

#### **Section WSER 7. Essential Water Use**

During water shortage emergencies, water use may be restricted to essential water uses only. The term "essential water use" is defined to mean water necessary for human consumption, sanitation, and fire protection. All other uses of water that are not specifically required to meet these needs shall be considered non-essential.

#### **Section WSER 8. Mandatory Water Conservation Stages.**

No Customer shall make, cause, use, or permit the use of water from the DWP for any residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Resolution or in an amount in excess of that use permitted by the Conservation Stage then in effect. For the purposes of this Resolution, any use of water on the subject property shall be imputed to the Customer including, without limitation, any use by a tenant or an employee, agent, contractor or other entity or individual.

The Board of Commissioners is authorized and directed to determine and declare the appropriate water Conservation Stage utilizing the factors contained in Section WSER 5 herein. Any Conservation Stage shall be effective upon the Board of Commissioners making such a declaration. Each water system within the DWP service area will be evaluated independently, and the water Conservation Stage for each system will be determined on a case-by-case basis.

There shall be four water Conservation Stages. The following rules and regulations associated with the Conservation Stages, described below, will be effective immediately upon declaration and approval of the Board of Commissioners.

#### **Section WSER 8.A. Conservation Stage I: Water-use Regulations.**

- A. Residential and commercial customers' overall water-use reduction target: 5%.
- B. Residential and commercial customers' outdoor water-use reduction target: 15%.
- C. Hose washing of sidewalks, walkways, driveways, parking areas, patios, porches, or verandas, except when needed to protect public health and safety is prohibited.
- D. All guidelines and regulations regarding Landscape planning and installation contained in Resolution No. DWP 2004-08A, as amended from time to time, remain in effect except for the following:
  - 1. Landscape irrigation will be permitted every other day.  
Addresses ending in odd numbers may water on odd numbered calendar days and addresses ending in even numbers may water on even numbered calendar days.

2. The square footage of turf shall be limited to 500 square feet for new or retrofitted landscapes.
- E. No DWP water may be used for soil compaction or dust control.
- F. Washing of vehicles, trailers, buses, or boats anywhere but at commercial car washes must be conducted with the use of a bucket and a hose equipped with a shut-off nozzle.
- G. Use of water from fire hydrants, except for fire protection purposes is prohibited.

**Section WSER 8.B. Conservation Stage II: Water-use Regulations.**

- A. Residential and commercial customers' overall water-use reduction target: 10%.
- B. Residential and commercial customers' outdoor water-use reduction target: 30%.
- C. All guidelines and regulations regarding landscape planning and installation contained in Resolution No. DWP 2004-08A, as amended from time to time, remain in effect except for the following:
  1. Outdoor irrigation will be permitted only on days authorized by the DWP Board of Commissioners.
  2. No New Turf will be permitted at any location.
- D. All rules and regulations contained in Subsections E, F, and G of Section WSER 8.A. shall remain in effect.

**Section WSER 8.C. Conservation Stage III: Water-use Regulations.**

- A. Residential and commercial customers' overall water-use reduction target: 25%.
- B. Residential and commercial customers' outdoor water-use reduction target: 60%.
- C. All guidelines and regulations regarding landscape planning and installation contained in Resolution No. DWP 2004-08A, as amended from time to time, remain in effect except for the following:
  1. Outdoor irrigation will be permitted only two days per week and will be specified by the DWP.
  2. Irrigation of turf shall be prohibited.
  3. No DWP water shall be used for ponds, streams, or fountains with a capacity greater than 50 gallons.
  4. No new turf will be permitted at any location.

- D. All rules and regulations contained in Subsections E, F, and G of Section WSER 8.A. shall remain in effect.

**Section WSER 8.D. Conservation Stage IV: Water-use Regulations.**

- A. Residential and commercial customers' overall water-use reduction target: 45%.
- B. Residential and commercial customers' outdoor water-use reduction target: 100%.
- C. No outdoor water use shall be permitted, except commercial car washes that recycle water.
- D. All guidelines and regulations regarding landscape planning and installation contained in Resolution No. DWP 2004-08A, or as amended from time to time, remain in effect except for the following:
  - 1. No landscape irrigation will be permitted.
  - 2. No DWP water shall be used for ponds, streams, fountains and new or unfilled swimming pools.
  - 3. No new turf will be permitted.
- E. No DWP water may be used for soil compaction or dust control.
- F. Use of water from fire hydrants, except for fire protection purposes is prohibited.

For quick reference, a summary of the regulations associated with the four water Conservation Stages described in this article is set forth in the following table. For the complete list of regulations associated with Conservation Stages I-IV, refer to Sections WSER 8.A, B, C, and D, respectively.

Stage I	Stage II	Stage III	Stage IV
Residential & commercial customers reduce use by 5%.	Residential & commercial customers reduce use by 10%.	Residential & commercial customers reduce use by 25%.	Residential & commercial customers reduce use by 45%.
Even/odd watering schedule, 15% reduction in outdoor water use.	Designated days watering schedule, 30% reduction in outdoor water use.	2 days per week watering schedule, target 60% reduction in outdoor water use.	No outside water use except car washes that recycle.
Promote indoor water use conservation.	5% reduction in indoor water use.	10% reduction in indoor water use.	20% reduction in indoor water use.
Permits required for new turf with size limit, 500 sq. ft.	No new turf.	No new turf.	No new turf.
		No turf irrigation.	No outside water use.
		No DWP water for ponds, streams, or fountains over 50 gallons.	No DWP water for ponds, streams, fountains, or new or unfilled pools.
No DWP water for soil compaction or dust control.	No DWP water for soil compaction or dust control.	No DWP water for soil compaction or dust control.	No DWP water for soil compaction or dust control.

The water-use restrictions, listed in Conservation Stages I-IV, provide general water use regulations to be implemented during water shortage emergencies. Additional restrictions and/or changes in the Water Conservation Stages may be recommended by the TRT and approved by the Board of Commissioners, whenever it determines necessary, in accordance with the considerations listed in Section WSER 5.

#### **Section WSER 9. Failure To Comply.**

Violations of this Resolution may result in either the installation of a flow restrictor or the termination of service in the manner set forth in the failure to comply provisions of Resolution No. DWP 2006-13 as now written or as amended from time to time.

**Resolution No. DWP 2007-02**

PASSED, APPROVED, AND ADOPTED this 27<sup>th</sup> day of February 2007.

AYES: Conley, Willey, Speyers, Miller

NOES: None

ABSTAIN: None

ABSENT: One Vacant Seat

2/27/07  
Date

Barbara L. Willey  
Barbara Willey, Chairman  
DWP Board of Commissioners

ATTEST:

Robyn Bratton  
Robyn Bratton  
Secretary to the Board

**CERTIFICATION**

STATE OF CALIFORNIA           )  
COUNTY OF SAN BERNARDINO )  
CITY OF BIG BEAR LAKE       )

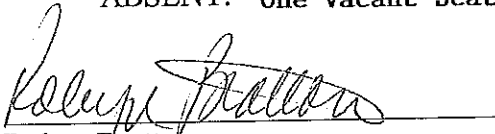
I, Robyn Bratton, Secretary to the Board of Commissioners of the Department of Water & Power of the City of Big Bear Lake, California, do hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2007-02, was duly passed and adopted by said Board, and attested to by the Secretary of said Board, all at a Regular meeting of said Board, held on the 27<sup>th</sup> day of February 2007, that the same was so passed and adopted by the following vote:

AYES:       Conley, Willey, Speyers, Miller

NOES:       None

ABSTAIN: None

ABSENT: One Vacant Seat

  
Robyn Bratton  
Secretary to the Board

(SEAL)

**RESOLUTION NO. DWP 2007-08**

**A RESOLUTION OF THE BOARD OF COMMISSIONERS  
OF THE DEPARTMENT OF WATER & POWER  
CITY OF BIG BEAR LAKE,  
COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA**

**RESCINDING AND REPLACING RESOLUTION NO. DWP 2005-03 AND  
ADOPTING UPDATED REGULATIONS FOR THE RETROFIT ON CHANGE  
OF SERVICE PROGRAM**

WHEREAS, on December 17, 2002, the Board of Commissioners of the Department of Water and Power, City of Big Bear Lake (the "DWP") declared a water shortage emergency within the DWP service area in accordance with Water Code sections 350 *et seq.*; and

WHEREAS, water shortage emergency conditions continue to exist, given that the estimate of perennial yield of the aquifers, water usage by customers, and the anticipated growth of the community within the DWP service area indicate that water demand may exceed supply within the next twenty years; and

WHEREAS, in order to protect DWP's water supply for human consumption, sanitation and fire protection, the DWP has adopted regulations that improve water use efficiency; and

WHEREAS, on May 25, 2004, the DWP Board of Commissioners adopted Resolution No. DWP 2004-05 which established, among other things, the retrofit on change of service program in DWP's service area; and

WHEREAS, the Retrofit on Change of Service Program was designed to promote water conservation by requiring the installation of water-efficient faucets, showerheads, and toilets; and

WHEREAS, on February 22, 2005, the DWP Board of Commissioners adopted Resolution No. DWP 2005-03 which updated the Retrofit on Change of Service Program; and

WHEREAS, in accordance with the authority granted by Water Code sections 350 and 375, the DWP Board desires to update and clarify the DWP's retrofitting requirements for the purposes of facilitating the enforcement of these water conservation measures.

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the DWP, City of Big Bear Lake, as follows:

**Section ROCS 1. Incorporation.**

The recitals set forth above are incorporated herein and made an operative part of this Resolution.

## **Section ROCS 2.     **Rescission.****

Resolution No. DWP 2005-03 is hereby rescinded and replaced in its entirety by this Resolution.

## **Section ROCS 3.     **Purpose.****

The purpose of this Resolution is to update and clarify the rules and regulations of the Retrofit on Change of Service Program which will thereby promote water conservation.

## **Section ROCS 4.     **Retrofit Requirements.****

A.     **Retrofit Standards.** Faucets and showerheads must have flow rates of 2.5 gallons per minute or less. Toilets must have flush volumes of 1.6 gallons per flush or less.

B.     **Retrofit.** Upon a change of service, all faucets, showerheads, and toilets shall be inspected by the property owner to determine whether the fixtures of the property meet the retrofit standards set forth in Section 4.A. of this Resolution. If the inspection reveals non-compliant fixtures, the property owner shall retrofit all such fixtures in accordance with the foregoing retrofit standards. A change of service occurs whenever the party responsible for the water bill at a property changes in the DWP's records.

C.     **Certificate of Compliance.** Within ninety (90) days of the change of service, the customer, shall file with the DWP a written certification of compliance ("certificate of compliance"), signed under penalty of perjury, confirming that all faucets, showerheads, and toilets conform with the requirements herein. If the customer fails to provide a certificate of compliance within 90 days of the change in service, the DWP shall be authorized to implement the failure to comply procedures in accordance with Section ROCS 7.

## **Section ROCS 5.     **Compliance Inspections.****

Any certificate of compliance, which is submitted to the DWP pursuant to Section ROCS 4, may be subject to verification through an inspection of the customer's premises by DWP staff. Authority and permission to enter the premises, for the purposes of verifying compliance with this Resolution shall be granted by the customer to DWP staff upon request and presentation of official identification. Compliance inspections will consist of a complete survey of all faucets, showerheads, and toilets of the premises to evaluate whether or not they comply with the flow rates or flush volumes specified herein. If any customer refuses admittance to, or hinders or prevents inspection of his or her premises, the DWP shall be authorized to implement the failure to comply procedures in accordance with Section ROCS 7.

## **Section ROCS 6.     **Exception****

A property owner may file a written request for relief from the retrofit requirements of ROCS 4, whenever there are exceptional, unusual and peculiar circumstances involved with retrofitting the property in question. Such a written request shall include all information he or she deems necessary for evaluation and resolution of the request and shall be filed within thirty (30) days of the change in water service.

H

The General Manager or designee shall review all requests for relief and may grant relief in instances when a property owner clearly demonstrates that he or she qualifies for the foregoing exemption. The General Manager or designee may grant, deny or modify the request for relief or impose any conditions he deems appropriate. The General Manager or designee shall inform the property owner of the decision in writing. The property owner shall have the right to appeal the decision of the General Manager or designee to the Board of Commissioners. The appeal must be in writing and received by the DWP within thirty (30) days of the date of the written decision of the General Manager or designee. The appeal shall be heard by the Board of Commissioners within a reasonable time of the date the appeal is submitted to the DWP. The DWP shall provide written notice, the time, and date of said hearing to the property owner. At the hearing, the Board of Commissioners may affirm, reverse or modify the decision of the General Manager or designee. The decision of the Board of Commissioners shall be final.

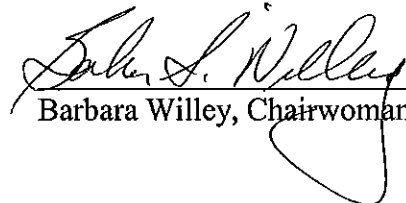
**Section ROCS 7.     Failure to Comply.**

Violations of this resolution may result in the actions set forth in the failure to comply provisions of Resolution No. DWP 2006-13 as now written or as amended from time to time.


Passed, approved and adopted this 24<sup>th</sup> day of April, 2007.

AYES:        Willey, Conley, Speyers, Miller  
NOES:        None  
ABSENT:     Giamarino  
ABSTAIN:    None

4/24/07  
\_\_\_\_\_  
(Date)

  
\_\_\_\_\_  
Barbara Willey, Chairwoman

ATTEST:

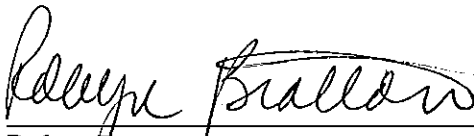
  
\_\_\_\_\_  
Robyn Bratton  
Secretary to the Board

**Certification**

STATE OF CALIFORNIA            )  
COUNTY OF SAN BERNARDINO )  
CITY OF BIG BEAR LAKE        )

I, Robyn Bratton, Secretary to the Board of Commissioners of the Department of Water & Power of the City of Big Bear Lake, California, do hereby certify that the whole number of members of said Board is five; that the foregoing Resolution, being Resolution No. DWP 2007-08, was duly passed and adopted by the said Board, and attested to by the Secretary of said Board, all at a Regular meeting of the said Board, held on the 24<sup>th</sup> day of April 2007, that the same was so passed and adopted by the following vote:

AYES:     Willey, Conley, Speyers, Miller  
NOES:     None  
ABSTAIN: None  
ABSENT: Giamarino



Robyn Bratton  
Secretary to the Board